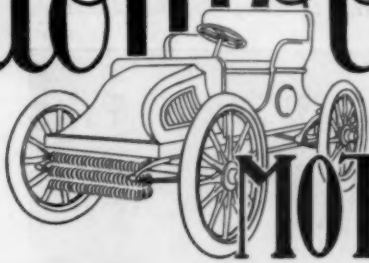


# The Automobile and WEEKLY MOTOR REVIEW



NEW YORK

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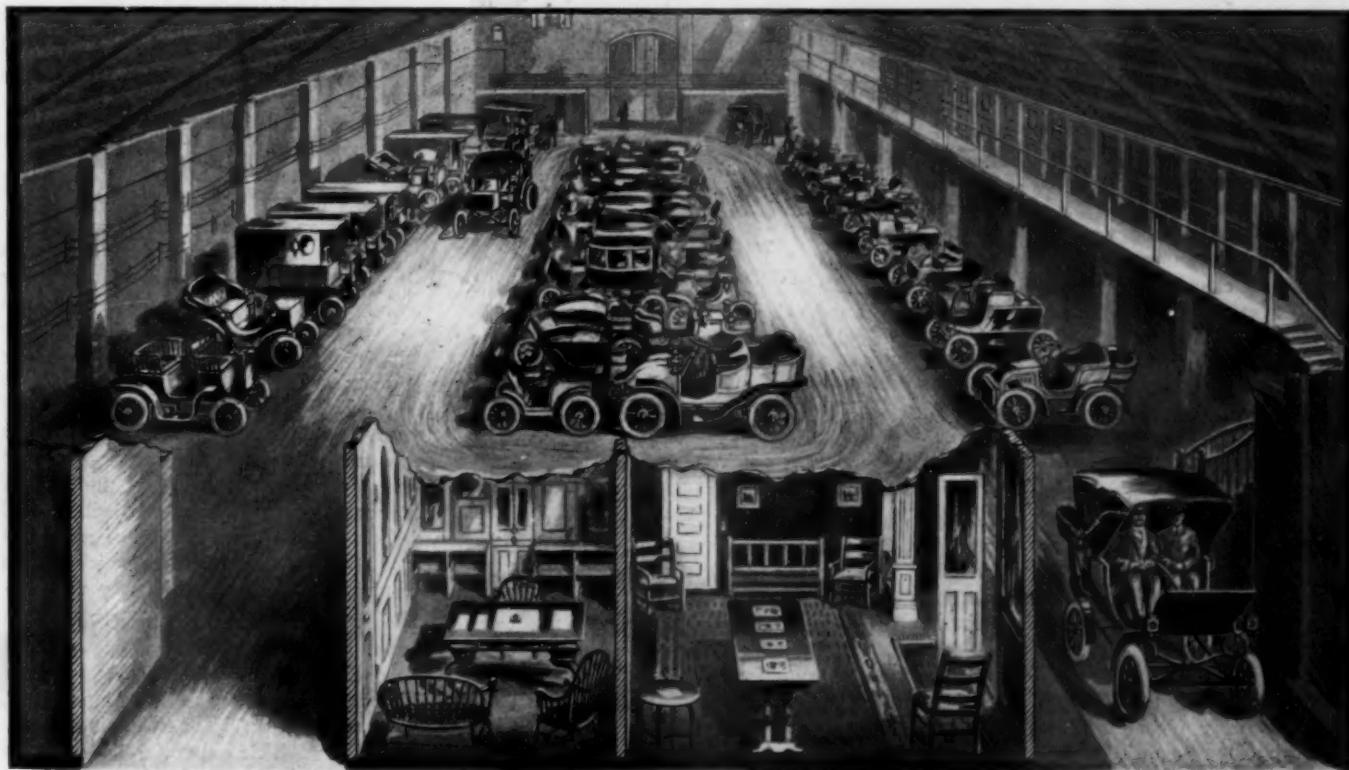
NEW YORK being the undoubted center of automobiling in this country, it is natural that the metropolis should be the first city in which the "garage," the twentieth century livery stable, would be permanently established as a regular phase of the town's life. Wherever there are automobiles in vicinities whose residents have

## Metropolitan Storage Stations

is probable that there are many persons not now using motor carriages who would do so were there convenient stations at which they might be kept. Thus a storage station may be established in the center of a community in which there are not enough

upon each other much in the manner of the first egg and the first hen. There must be automobiles in use in order that there can be storage stations; and there must in many vicinities be storage stations that there can be automobiles in use.

While the need and certain future establishment of storage stations in the different



GENERAL VIEW OF INTERIOR OF THE CENTRAL AUTOMOBILE STORAGE STATION, NEW YORK

not individual means for caring for the machines, there is need for storage stations, and wherever there is such a need storage stations will be established as rapidly as the growth of the use of automobiles necessitates. Perhaps the development of the storage station or garage will lead the use of the automobile instead of follow it; for it

machines to fill it; but as soon as it has been opened new purchases of vehicles will be made by parties who previously had no facilities for storing and caring for their machines, and consequently the station's capacity may soon be taxed. The development of the automobile and that of the automobile storage station are dependent

portions of all the large cities is plain, their present establishment in numbers and total capacity proportionate to the use of automobiles is practically limited to New York. In other large cities some of the local agencies and retail branches have limited facilities for storing a few of the vehicles purchased of them, and in some cities

there are a few more or less well equipped storage stations. But these are not well distributed through the residence neighborhoods and cannot in size and number meet the rapidly increasing patronage. In Chi-

biles. They are well distributed throughout the city and future increase in their number does not mean ramification into new neighborhoods so much as their establishment at more frequent intervals.

mobilists of that vicinity, who have previously been put to inconvenience or unwarranted expense in having their machines cared for, consistently give their patronage to the new establishment. A resident of that neighborhood buys an automobile and immediately seeks the nearest and most convenient station. There is little of forced trade methods or direct competition in the conduct of the storage station business. No district has an oversupply of storage facilities.

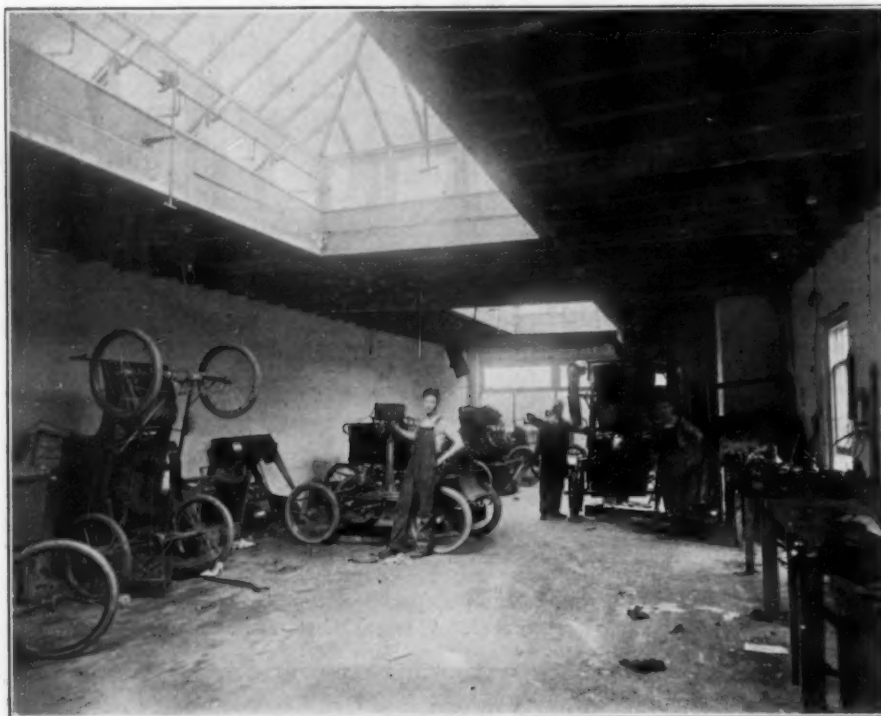
#### First-Class Arrangement

The storage station should get the trade in its vicinity just as the automobilists of a vicinity should have a convenient storage station. That these needs equalize each other at present in New York there is no doubt. Many of the stations include agencies for certain automobiles. Yet neither is the storage at these stations limited to the vehicles sold nor are the majority of the vehicles sold stored where bought. The automobilist may buy on Forty-third street and he may store his purchase on Eighty-ninth street. The only stations whose storing business is mainly in vehicles sold by them are the ones selling European cars exclusively. From these many large and high-powered cars are sold to parties who use them more for pastime than for constant utility and convenience as well as pastime, and who hence have not the need for convenience in storing that has the ordinary purchaser.

From the smallest to the largest the storage stations of the metropolis indicate a desire to create for the future. There is a decided tendency toward thorough equipment, permanent installation of conveniences and even of luxuries. The crudeness of the horse stable is not evident, and every step that is taken toward more complete equipment reflects upon the convenience and pleasure of the automobilists. The manner in which some of the stations are being equipped and handled is an object lesson, teaching graphically one of the great advantages of the motor over the horse for city use. Others of the stations are not so fortunately established, but all of them possess more or less of an air of clean, thorough furnishing, which shows the great possibilities in the way of delivering the future storage station forever from the rank of the stable.

#### Full of Detail

From the standpoint of the automobilist, the storage station is an ideal institution. It takes his vehicle either for dead or live storage, and for a stipulated sum keeps it in good condition and ever ready for use. It not only furnishes him with the storage room he may not have at his residence, but it provides him with the service which he may not care to employ especially for the purpose of caring for his machine. It furnishes him repair facilities which enable him to secure repairs at regular cost at the same place at which his machine is kept when not in use. It furnishes him



THE HOMAN & SCHULZ REPAIR SHOP

cago, for instance, with its three great divisions of the residence portion, there are but four storage stations—two on the south, two on the north, and none on the west side. Yet there are in constant use in Chicago about 600 automobiles.

It is, of course, plain that New York needs the storage station more than do the less congested cities, even in proportion to population and number of vehicles in use. Still, just as it leads in automobiling enthusiasm and interest, it leads comparatively in the number, capacity and distribution of its storage stations. Also the rapidity with which these stations have sprung up and quickly gathered trade furnishes substantial evidence of the great importance of the garage as a factor in the automobile trade. With its probable 2,000 automobiles it has about two score of storage stations and combined stations and agencies, whose capacity extends from 20 to 150 machines. These are spread over a territory reaching almost from the southern to the northern limits of the borough of Manhattan, and likewise spread practically from the East River to the Hudson.

They are in both business and in residence neighborhoods, although nearly all of them are within close range of a large residence territory. They are in both old and new buildings—some in remodeled stables, skating rinks and store buildings, and some in structures erected especially for the purpose of storing and caring for automo-

There will be a need for the extension of the chain northward, across the Harlem, perhaps; and for Brooklyn and other Long Island stations.

#### Trade Readily Secured

The work of establishing the series that will some day be a great chain of closely-linked storage stations has already begun. Those who have this spring entered the field have not selected sites, as pioneers, sure of patronage wherever located, might, but in addition to taking advantage of early prestige in the field, have chosen vicinities where a constant and permanent trade is assured. Some of the stations are grouped in locations which are recognized as automobile trade districts, but these districts also are convenient to many users of vehicles, and the grouping tendency is not likely to progress beyond the needs of the surrounding residents.

That the present influx of American and European automobiles of all patterns into New York has a marked influence upon the trade of the storage stations is shown by two patent conditions. First, despite the number of persons who have already left the city for the summer, the stations are daily securing new customers. Secondly, the majority of the managers of the stations assert that their trade comes naturally and without coaxing. Very few of them have found it necessary to hunt for patrons. A storage station is founded in a certain vicinity and some of the auto-

with a natural headquarters for automobile accessories and appurtenances. It rids his own mind and attention of all of the petty detail, and by doing all this for many instead of for only one, can profitably provide the service at a rational cost.

From the standpoint of the proprietor or proprietors of the storage station, it is not an ideal business institution. It is needed, necessary, and will, at least eventually, be profitable. But for every small burden that is lifted from the shoulders of the patron another burden is assumed by those in charge of the station. Automobiling is at present replete with troubles and sorrows as well as with pleasure and joy. Many of these are petty and trifling, but multiplied by the number of machines stored they necessarily make the business one of detail which must be closely watched. There is plenty of work to do around a storage station, and it must be done promptly and well. In the midst of a transition period when the whole automobile industry and sport is shaping its future course, the storage station; as an important branch of the trade, cannot bring itself and its kind into disrepute by failing to master the detail which is taken singly from the automobilists and collectively manipulated under the station roof. Some day, by the improvement of machines and the narrowing of types and patterns, the handling as well as the building of automobiles may be run into a comfortable groove in which detail cares for itself.

Luckily, the managers of the New York storage stations seem to have at once appreciated the great necessity of paying the strictest attention to the small points. Nearly every station in the city is operated on a basis which to the caller appears smoothly running and well grasped. Confusion is not as apparent as one might expect, and altogether the patrons seem to be about as well served in practice as in theory the storage station is supposed to serve them.

#### Selling Second-Hand Machines

One branch of the storage business which has grown up with its main purpose almost from the beginning is the selling of second-hand vehicles. And here is a better combination than the selling of new machines in connection with storing. Numerous commercial conditions other than that of getting in touch with the buyer govern the conduct of the retail automobile store. Automobiles are not selected simply because of the convenience of the store to the purchaser. It is not necessary that the store should be in close proximity to the trade it expects to secure. The combination of a retail salesroom with a storage station is for other reasons: first of which is doubtlessly that of the desire to handle, for profit's sake, both branches. In the sale of second-hand machines, however, the storage station is the natural medium.

Its proprietor is acquainted with the characteristics of the various makes and is fa-

miliar with their comparative values. He is in a position which enables him to display the machine while it is still in use by the owner. He has a repair shop which enables him to thoroughly overhaul when necessary, and thus give the machine a greater market value than it might possess if sold just as it stands. He is sought both by those who have machines to sell and by those who wish to buy. He occupies without effort the position of broker. He can grasp the advantages thereof at will.

It is accordingly not surprising that the majority of the second-hand sales in New York are made through the storage stations. One of the proprietors of an uptown station at which, also, several lines of new vehicles are carried, said recently that the business in second-hand machines had been one of the most profitable features this spring. The second-hand vehicles are handled both on commission and by outright buying and selling.

#### The Summer Exodus

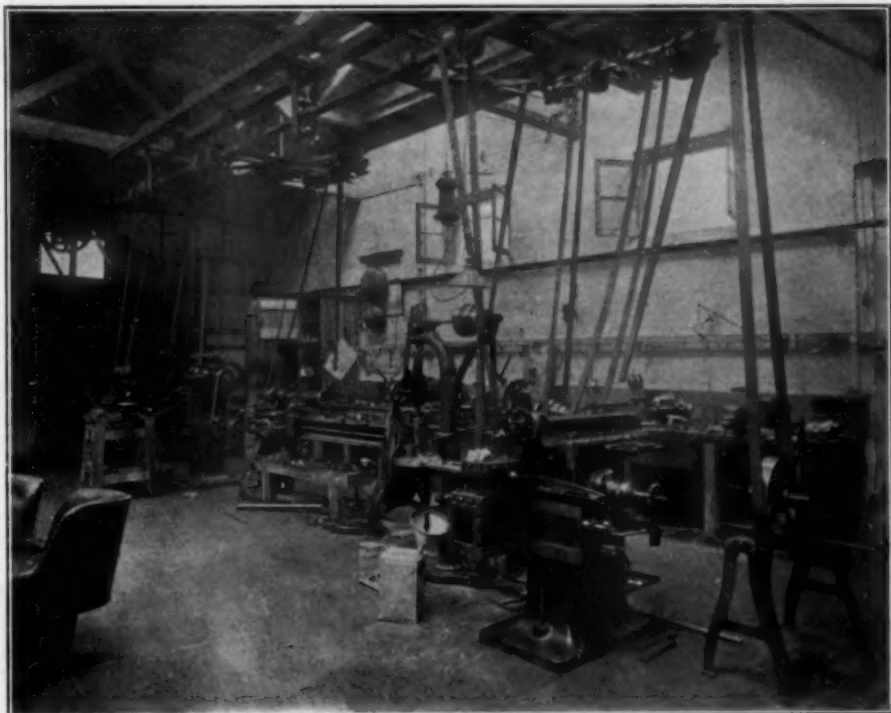
New York being notable for the percentage of its prosperous residents that seek other scenes of activity or lassitude during the summer months, a considerable portion of the regular trade of the storage station is taken away during those months. The managers of the different prominent stations have estimated this portion at from twenty-five to fifty per cent. The percentage at some stations might be still larger were it not that numerous owners leave their vehicles in dead storage during the

of vehicles in use increases. The total of vehicles in use and stored at the stations may readily become so great that the percentage belonging to the class which leaves for long periods during the summer will be small enough to prevent a great depreciation in the station patronage.

#### Specialization Assured

There is still another important item in the manner in which the storage trade is handled which tends toward a general and rapid growth of the business. Already the stations are specializing. Several New York stations handle only gasoline and electric vehicles, leaving the care of the steam machines to other general stations and to the stations in connection with the agencies for steam vehicles, the presumption being that their careful maintenance can be better assured by those who make the steam vehicle a special study.

The first work in the development of the storage field is, of course, to spread the stations throughout the city that the automobilists in all vicinities may be provided with storage facilities. It is probable that the next step will be to divide into special classes in each vicinity as well as in a few instances, as already noticed, so that there will eventually be in the majority of storing centers not only a total of stations sufficient to handle the trade, but separate stations for the different types of vehicles. Some of the stations may ever continue to handle all classes and types of automobiles, but the fact that, even in this early stage



THE ADAMS-MCMURTRY CO.'S REPAIR SHOP

summer, while others owning more than one vehicle, do not take all of their machines with them when leaving town.

This phase of the business will gradually become less important as the number

of the business, discrimination in favor of certain types at certain stations is in progress, shows plainly that specialization will be the forthcoming rule.

In the matter of charging for services

rendered there is at present only a semblance of uniformity. The general trend of prices is better gauged than the manner in which the charges are made. At some of the stations a certain monthly charge is made for all gasoline machines, this price including general care, cleaning and the supply of lubricating oil. At others the price is gauged by the pattern of the vehicle, a greater charge being made for the heavy than for the light cars. At some stations a regular price is charged for all electrics and the owner allowed unlimited charging facilities. At others the charging privilege is limited to once a day. At still others a flat rate is made for the storage of all electrics, and the charging is extra and in accordance with the current used. In other instances the price for electrics varies also according to the pattern of the carriage. The steam machines are handled much in the same manner as the gasoline vehicles, the charges generally being uniform for storage and care, with fuel extra. None of the stations make a sweeping charge for gasoline and steam vehicles, covering the supply of fuel as well as the storage and care.

The price schedules of some of the leading New York stations will give a better idea of the range of prices and the manner in which the charges are made.

#### Current Prices

The American Storage Co. makes a uniform charge of \$20 for all kinds of vehicles with the exception of electrics. This price includes cleaning, adjusting, oiling, etc. The fuel is supplied extra. For electrics a uniform price of \$35 per month is made, which includes all charging.

Pa-Delford & Bell have a uniform charge of \$20 per month for gasoline and steam machines, but charge for electrics according to the character of the vehicles. For runabouts the price is \$35, including charging; for victorias and stanhopes, \$40, and for broughams, \$45. For dead storage of all kinds of vehicles the monthly charge is \$12.50.

Homan & Schulz charge \$15 a month for steam and gasoline runabouts; \$25 a month for electric runabouts, including charging, and \$20 for large cars, with fuel, or charging, if electrics, extra.

At the John Wanamaker station a uniform charge of \$18.50 a month is made for storing, cleaning, daily inspection and adjusting and oiling for all kinds of vehicles except electrics. The same service without the daily inspection and oiling is given for \$15. For electrics of runabout and stanhope patterns the price is \$15 a month, including charging once a day; for surreys and victorias \$20, and for broughams and large victorias \$25. Carriages will be delivered once a day within four miles of the station for an additional \$5 per month.

Practically all of the stations keep one or more emergency wagons with which, upon telephone call, trips will be made to bring in unlucky motorists whose machines tem-

porarily need exterior power. Usually a charge by the hour for the vehicle and for each of the men sent with it is made for such work.

#### Repair Shop Conditions

The repair shop is, of course, a necessary and permanent adjunct to the storage station. Yet it is the one end of the business which has not been developed in keeping with the other features. All of the New York stations are fairly well equipped with repair shop facilities and manage to handle all of the ordinary repairing. But not all of them have fully equipped shops in which general machine work, such as is often necessitated, can be accomplished.

Most of the stations' shops are fitted with a good supply of bench tools and with a lathe and drill press, but few have more than this in the line of machine tools and some do not have the useful lathe.

Improvements in the shops this spring and the equipment being installed by the newer stations are indicative of a tendency to bring the shops up to the level of thoroughness with which the more commercial branch of the storage business is handled. Also, despite the infrequency of fully equipped shops, there is a universal attempt to provide competent workmen and in most places specialists are employed who only look after repairs on the class of vehicles with which they are most familiar. This specialization of the repairing is carried further in certain instances, in which separate rooms are provided for the repair of distinct types of vehicles. As an example, at the Central storage station there is a room on one side of the building in which the gasoline vehicles are repaired and another on the opposite side in which the electrics are cared for. Steam machines are not handled here. Also there are numerous instances in which, while the general repairing is all handled in one shop, a special room is provided for electric storage battery work, this being in charge of a battery expert.

The discrimination in classes of repairing follows that relative to the storage of vehicles. Stations which do not store all classes of vehicles do not handle general repairing to further limits than those of the storing branch. The repairing and the storing is closely linked and the specialization of both progresses evenly. There is less chance for the general establishment of exclusive repair shops handling all classes of work and of general storage stations, storing all classes of vehicles and working in co-operation with the repair shops, than there is of the continued combination of storage stations and repair shops and the specialization of the dual establishments.

#### Storage Station Requirements

It is interesting to note that in New York the conception of the manner in which the general requirements in a storage station should be given expression in actual practice is about the same throughout the

trade, a greater difference existing in the size and scope of the various establishments than in their character, arrangement and methods of operation.

The first consideration in a station is ample room for the storage of the vehicles so that any one of them can be taken out at any time without disturbing the others, which necessitates plenty of open floor space as well as actually occupied space. In the New York stations the room, with the exception of at a few stations occupying extraordinarily large buildings, is secured by the utilization of several floors; and consequently of especially installed elevators which are capable of handling the largest and heaviest vehicles. Some of the stations occupy as many as four floors and a basement.

In one or two instances an attempt is made to keep the heavier vehicles upon the main floor, but the general practice is to group them on the different floors with more regard to motive power than to shape and weight, sometimes a floor being reserved for electrics, one for steamers and another for gasoline vehicles.

#### Repair Shops at Top and Bottom

Several of the repair shops are in the basements, so that they can be in close relation with the outside and underground gasoline storage necessitated by the insurance underwriters, and so that whatever machinery is employed may be firmly installed, as upon a cement floor. On the other hand there is a tendency to place the repair shop on the uppermost floor, so that by means of skylights ample light is assured.

One advantage of the basement shop is that a pit over which a vehicle can be run when it is desired to work underneath it can be conveniently installed. This advantage is offset in the upper story shops by jacking arrangements, whereby the vehicle can be either tipped up on end or lifted bodily upon a sort of platform crane. The battery room is seldom in close conjunction with the floor upon which the electric vehicles are regularly charged, as the two lines of work are not really closely connected. The work of charging is one in which convenience for the owner is more important than it is in that of working on the batteries.

The cleaning, oiling and common overhauling which does not require actual repair shop work is generally done on the main floor or in a rear addition to it. Here one or more washing stands are provided. The washing of the vehicles is accomplished substantially the same as that of horse carriages in a regular stable, and in some of the stations the men employed to do this work are old livery stable washers.

The first floor accommodations also generally include some provision for the reception of customers, aside from the small business office. Thus several of the stations provide rooms which are furnished as comfortable lounging quarters. In some

instances a table full of current issues of automobile journals add to the convenience and desirability of this department. One of the stations supplements the reception or lounging room with a small apartment fitted up as a ladies' room. This is at present not much used, and it may never be drawn into constant usefulness, but possibly the steady increase in the use of the automobile by women may make such a room a future convenience to be maintained if there is space for it.

All of the stations provide a room fitted with a series of individual lockers in which the patrons may keep automobiling clothes and small accessories. At some of the larger establishments the locker room is supplemented by a well-arranged toilet room including shower bath. A shower or other bathroom is also generally provided for the chauffeurs, who are even more liable to wish to "clean up" at the station after a dusty drive than are their respective employers. As a further convenience for the professional drivers there are at some of the stations lounging rooms dedicated to their exclusive use, it being a part purpose of the plan to assist in establishing amicable and pleasant relations among the drivers by offering them a permanent assembly room for idle hours. Lockers are also sometimes provided for the chauffeurs, though in many cases the chauffeurs' automobile costumes, etc., are kept in the individual lockers of their employers.

#### Supplying Sundries

Provision is made at nearly all of the stations for supplying patrons with sundries, articles of wear, etc. Generally this stock is kept in the office if a stock is maintained. Where the station is combined with a general automobile supply store or vehicle agency this portion of the business is, of course, separated from that of the station itself. The telephone is a small but imperative part of the establishment. The owner may at any time send for his automobile, or, in case of a breakdown on the road, may 'phone for assistance. Also, the key of the storage station is virtually thrown away, as it is a part of the scheme of the institution to be open day and night the year through.

While the various stations resemble each other strongly in the manner in which the main requirements of such an establishment are met, a study of the exact manner in which they are carried into effect at a few of the leading stations is interesting.

#### A Unique Station

The Central Automobile Co., at 1684 Broadway, operates one of the oldest and largest stations in town, and one which is unique in its arrangement. It occupies a wide, deep, one-floor building, which has in the past served in varied capacities, such as skating rink, picture gallery and electric transportation stable. A gallery extends across its front and along one side, and the front portion of this is occupied by the business office.

Directly underneath the office, on the main floor and between two vehicle entrances into the building, are two reception and lounging rooms for patrons. One of the driveways is principally used, and along its side is a platform which connects with the reception room. The main floor is open and in one large apartment with a storing capacity of 200 vehicles. These are arranged in long rows, of which there is one along each wall and two in the center of the floor. All of the vehicles are run into standing position crosswise of the building so that any can be taken out without disturbing the others. The electric charging rheostats are on the left wall, and the electrics are mainly kept in the row along this wall, the exceptions being charged vehicles which have to be placed elsewhere to make room for uncharged vehicles. Steam machines are not stored, and the gasoline cars, a large portion of which are of French manufacture, are arranged without regard for size, the whole collection of vehicles being placed so that one position is as convenient as another.

In each of the rear corners of the building is an enclosure serving as a repair shop, one for electric and one for gasoline vehicles. On the side gallery has been arranged a series of lockers for the patrons. These are conveniently reached by corner stairs at the front. The company expects to lay a central gallery or second floor over a portion of the main floor in order to increase the storing room by about 80 vehicles.

#### Two Typical Establishments

Homan & Schulz, Broadway and 100th St., regularly store 50 vehicles, but can accommodate more by a little closer arrangement of the cars. All of the steamers are kept in the basement, the electrics on the main floor, which is also the charging floor for them, and the gasoline carriages on the second floor. The top floor is devoted entirely to repair work and is among the largest and best-lighted shops in the city. Its equipment includes lathe, drill and air compressor, driven by a gasoline engine, and a special repair jack or crane, by means of which a machine is hauled up to a vertical position by the front axle. Twelve men, outside of the managing and office force, are employed caring for the vehicles. There are 60 lockers in a rear room on the main floor. In addition to the main entrance in front there is a side yard with wide door into the building and containing also a small track on which repaired vehicles can be tested without taking them into the street.

The John Wanamaker establishment, at 138 East 57th St., occupies five floors. In the basement are the repair shop and battery room. The shop equipment includes, besides the regular bench outfit, a lathe, drill press, emery grinder and forge. The machine tools are driven by a power plant in the front part of the basement, which also operates the electric generator for the charging and lighting system. Electric ve-

hicles can be charged on several floors, and there is no definite arrangement of the different classes of vehicles on any of the floors or by floors. The space is simply used as thought best at any time. The elevator, which is in the rear, is one of the largest and most powerful automobile elevators in the city.

There are wash rooms on every floor. The lockers for the vehicle owners are in the basement, and there is a separate series of lockers for the chauffeurs on the third floor. In conjunction with the latter is a shower bath. A front room on the second floor is fitted up as a ladies' sitting or waiting room. In connection with the office enclosure on the main floor are cases containing an assortment of automobile accessories, caps, coats, etc.

The station has been established about a year and stores regularly 60 vehicles. Its full capacity is about 80 vehicles. Twenty-two men are regularly employed looking after the carriages.

#### Remodeled Livery Stable

The American Storage Co. is newly established at 40 West 60th St., where it occupies a large building of five floors and basement. It is a remodeled livery stable, and so many changes have been necessitated that the building is hardly in finished order at present. The regular storage of vehicles began about the first of May, however, and there are now 60 vehicles in charge. There is still work to be done in adding to the equipment and conveniences and in furnishing the establishment in a more thorough and elaborate manner than when it existed as a livery stable. For instance, the old lockers, which are in a small room on the main floor, directly back of the office, will be entirely remodeled, as will also the rear portion of the main floor, which is used for washing the vehicles.

The storage space on the main floor is principally devoted to heavy gasoline carriages, which may be run in and left in position for storage without rehandling. Electrics are also charged on this floor, but are stored on the third floor. The latter floor also contains the battery room. The second floor is devoted entirely to the Oldsmobile, of which there exists quite a colony in storage at this station, the management having a special arrangement with the local agents for the Oldsmobile whereby special attention is given this carriage. Such attention is not at the expense of other vehicles, however, as it simply necessitates the engagement of additional and specially adapted employees.

The fourth floor is devoted to general storage. Under a skylighted roof the repair shop occupies the fifth floor. It is only temporarily installed here, however, as it is the present intention to eventually move it to the basement. The latter is as yet not entirely rid of rubbish left there as the result of cleaning the other floors.

Another almost brand new establishment is that of Padelford & Bell at 250 West

80th St. It is in a new building of three floors and basement, with a combined floor area of 100,000 square feet, or room for 150 vehicles. The repair shop is in the basement and includes a small tool room, which is well equipped for ordinary machine work, the tools being driven by an electric motor. The washing stands are also in the basement.

General storage and the charging of transient electrics are handled on the main floor. The regularly stored electrics are charged on the second floor, three charging rheostats being provided. The third floor is reserved for dead storage unless the capacity of the other two is overtaxed. The locker room and shower bath for owners is on the top floor.

The Bowman Automobile Co., while not newly organized, occupies a newly furnished building at 52 West 43d St. It has four floors, all of which are well finished and scrupulously clean. The repair shop is on the top floor, and all of the other floors are devoted to general storing. The Bowman company, on account of its agency for steam carriages, has specialized more or less in this field of storage also, and in its repair department particularly handles a greater percentage of such work than of others. About 20 men are employed in the station.

#### Full of Foreigners

Smith & Mabley, 513 Seventh Ave., while not operating a general storage station for all kinds of vehicles, still have one of the most interesting stations in New York. They are agents for several well-known makes of French automobiles, and have imported some of the largest, most powerful and most expensive foreigners brought to this country. It is thus natural that their storage station, in which the vehicles sold by them are cared for, should contain one of the most notable collections of vehicles in the city.

The establishment is large and well fitted up. The vehicles in use are kept on the main floor, while the offices are on the second floor. These are almost elaborate in their appointments. The rear of the second floor is occupied by an assembling room for new vehicles.

The Spalding storage station is in an independent one-story building in the rear of the Spalding automobile and sporting goods store at 29 West 42d St., with its entrance in the rear. About 50 vehicles can be comfortably cared for, and the appointments are thorough and arranged with view to the quick handling of all work. On account of its combination with the store there is no need of the office and reception rooms provided at some of the exclusive storage stations.

#### Has a Model Repair Shop

The Adams-McMurtry Co., 317 West 59th St., does not make either a specialty or a general business of storing automobiles. Being the local agent for the Packard and gasoline carriage, and having a limited

storage space on its sales floor, it cares for about a dozen of its customers' vehicles. But in the matter of a repair shop it sets an example to the local trade. Gasoline vehicle repair work for the general trade is here handled in a manner which is indicative of what the average automobile repair shop may become in the future. It is not merely a place for the accomplishment of ordinary repairs which necessitate little machine work, but is fully equipped for any and all jobs which may be needed, even in the face of inability to quickly obtain duplicates of broken or injured parts. In fact, so well is the place fitted for making new parts that no stock of new duplicates is carried or sought. Unfinished forgings are kept in stock, and when needed are finished to suit the occasion.

The power for the shop is a 20-h.p. vertical gasoline engine, which also drives an electric generator furnishing the establishment with its lighting current. The machine tool equipment comprises two engine lathes, a universal milling machine, a shaper, a small sensitive drill, a regular drill press, a power hack saw and an emery grinder. There is also a forge and equipment. For the convenient handling of work underneath vehicles a hoisting frame or platform, on which a carriage may be jacked and then lifted as high above the floor as desired, has been devised. This permits the workman to stand upright under the vehicle and directly upon the repair shop floor, which is obviously more convenient than standing within a pit. One of the accompanying illustrations furnishes a good idea of the general equipment and arrangement of this model repair shop.

Considering the comparatively short time since such an institution as a public automobile storage station became needed in a large automobiling center, the development of the stations in New York has shown not only rapid progress, but an exceptionally acute early insight into the necessities of the situation, both for the present and for the future. The stations have certainly shown that this is to be not only an important but one of the most important factors of the automobile industry.

#### A NEW DE DION MOTOR

New Arrangement of Time-Shaft and Exhaust-Gear in Bicycle Motors by Which the Width of Case is Reduced

The makers of petrol motors, both here and in France, clearly expect the demand for low-powered, air-cooled gasoline engines to continue, for they do not cease to give their attention to the improvement of these little propulsors. Messrs. De Dion, Bouton & Co. are the last to put forward an improved engine for bicycles, and therein they have been introduced a novel and ingenious feature, with a view of reducing the over-all width of the motor to a minimum.

In lieu of placing the time-shaft in a short, externally-produced bearing parallel

to those of the crank shaft, they now place the time-shaft at right angles to and above the crank discs or flywheels, thus obtaining a long bearing for each end of the shaft in each side of the crank chamber. The periphery of the left-hand disc has cut upon it two turns of a worm-thread, which engages with a worm-wheel keyed to the center of the time-shaft. The threads on the flywheel are cut at such an angle that two revolutions of the crank-shaft are necessary to obtain one of the worm-wheel on the time-shaft, and thus insure the requisite actions of the commutator and exhaust cams carried, one at each end of the shaft.

The compression tap so usually fitted in the top of the combustion chamber is done away with, and its purpose is served in the De Dion bicycle engine by the introduction of an exhaust lever pivoted on a spindle carried on a stopped cam. The free end of this lever is fitted with a friction roller, which is in contact with the exhaust cam when the valve is in course of opening, but by means of outer attachments to the cam to which the exhaust lever is fitted the lever can be so raked in position that the lift of the exhaust valve is varied to any desired degree. Indeed, by rotating the exhaust lever cam to the fullest extent allowed by the stops thereon, the friction roller at the other end of the exhaust lever is caused to run up a small inclined plane formed in the exhaust gear case, and, the lever being raised to its uttermost, the exhaust valve is held open and the exhaust lifting rod cut off from contact with the exhaust cam. This is done when it is desired to start the bicycle by pedaling, or to take an opportunity of cooling the engine when coasting.

Another remarkable feature is the entire absence of radiating ribs on the cylinder, which is quite plain, the combustion chamber or cylinder only being cast with these additions. The result of this design is the reduction of the over-all width of the motor to 3.9 ins., which will permit of its being carried low down on the diagonal or bottom tube of any ordinary bicycle frame without interference with the standard treads of these machines, which are never less than 4½ to 4¾ ins.

In view of the very languid interest now taken in this country in the hub pivot system of steering knuckles, over which there was such a craze five years ago, it is decidedly interesting to note that the latest Mercedes machines are equipped with this very system. What is more, it is apparently a success. The explanation, we fancy, may lie in the fact that the German makers are not afraid to make their hubs of liberal diameter, thus giving room inside for a substantial pivot, instead of the flimsy affairs which we used to see in cars made nearer home. There is no question of the theoretical value of the hub pivots in reducing the shocks and stresses on the steering gear, and it is to be hoped that it may once more become popular here.

# The Gasoline Vehicle

## I. COMBUSTION IN HIGH-SPEED MOTORS

(Continued from June 7.)

The *modus operandi* of the "four-cycle" explosion motor, which to-day is used for vehicle propulsion, to the practical exclusion of other forms of internal combustion engine, is at this date sufficiently familiar to require no extended description. The explosive mixture, of air and gas or gasoline vapor, is sucked into the cylinder by outward movement of the piston, compressed on the return stroke of the latter to about a quarter its original volume, and exploded by electric spark or otherwise. The heat thus liberated increases greatly the pressure of the gases, and this pressure impels the piston on the next onward stroke. The subsequent stroke is devoted to the expulsion of the spent gases, and the cycle is then repeated.

Although the ignited gases are conveniently spoken of as "exploding," it is necessary to bear in mind, first, that the "explosion" is never instantaneous, but requires a time whose duration depends on several factors—such as temperature, degree of compression, richness and homogeneity of the mixture and mode of ignition, all of which will be taken up in detail later on—and, second, that the final result of the explosion is very different from, for exam-

allowed to cool, actually less. They owe their great expansive force solely to their high temperature, by the law that the product of the pressure and volume of a given weight of gas is proportional to its "absolute" temperature (i. e., above absolute zero  $-273^{\circ}$  Cent.). The rapid shrinkage and loss of pressure of the burnt gases, due to the unavoidable use of a water jacket or other means to keep the cylinder walls within safe limits of temperature, explains both the low efficiency of small slow-speed motors, whose cylinder walls are of large area relatively to the volume of gases contained, and the gain in efficiency of the same motors when so designed that they may be run at high speeds and the pressure of the hot gases converted into useful work before they have time to cool.

### Advantages of High Speed

As it is desirable both that an automobile motor should be as light as practicable for a given power, and that its full bill for that power should not be needlessly high, the small and high-speed motor is the logical conclusion. Such a motor, however, is a difficult problem for the designer, and requires more care and attention when built than a slower motor. When not pushed to an extreme it is justified by the great reduction in weight thereby made possible in the entire machine, and by the greater safety, lower power and fuel cost, and—last but by no means least—the saving in the tire bill.

If we look first at the internal action of, for example, a motor of 4 inches piston diameter and 5 inches stroke, we shall see that an increase in speed from, say, 500 turns per minute to double or treble that number, results in some marked changes in the cut-and-dried cycle of suction, compression, expansion and exhaust. At the former speed, the easy jog-trot of an old-fashioned launch engine, it could be depended on for  $2\frac{1}{4}$  or perhaps  $2\frac{1}{2}$  horsepower. If not designed to run faster, little or nothing will be gained by speeding it up, for it will lose in the force of the individual impulses what it gains in speed. But, if designed aright, it may be made to give 5 h.p. at 1,000 turns, and not far from 7 h.p. at 1,500, which may be considered near the limit of useful increase in speed. Let us see in detail what must be done to make these speeds possible.

### Essentials of High-Speed Design

In the first place the mixture must be made to burn as rapidly as possible. At 1,500 r. p. m., the motor passes through  $12\frac{1}{2}$  complete cycles, or 50 strokes, in a second. Though it is doubtful if any one

has been able to measure the elapsed time during combustion, it is certain that it is much easier to build a motor which shall but half burn its charge, in the brief fraction of a second before the exhaust valve is opened, than one which shall burn it all, as it should, before expansion has progressed very far. In a small motor combustion may without detriment to efficiency be prolonged somewhat further in the

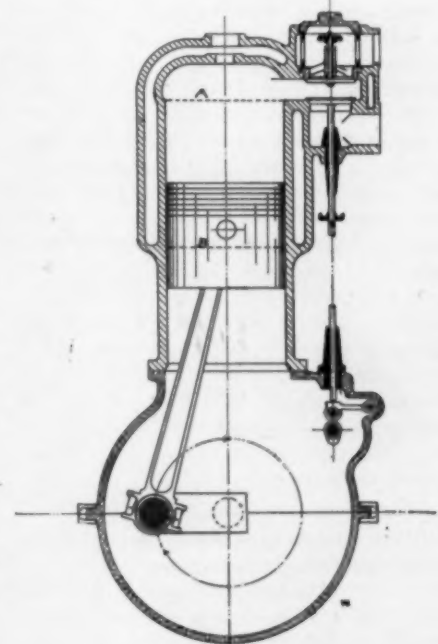


Fig. 2.

power stroke than in a large one; but it should never fail to be completed by mid-stroke at the latest, and at high speeds the charge may to advantage be burned more rapidly. For shaft speeds upward of 1,000 r. p. m., the ideal combustion period would probably be about one-eighth of a revolution, beginning with the crank a very little before the top center. This is about what would be found in stationary engines of moderate speed; but at high speeds it is found impossible to accomplish the "inflammation" of the charge with the necessary rapidity unless ignition takes place much earlier. It is then a question of losing efficiency by compelling the piston to work against an undesirable pressure, due to ignition before the compression stroke is completed, or of losing efficiency by undue prolonging of combustion, liberating the heat energy too late to utilize it in the stroke.

### Practical Considerations

In practice, ignition may occur with the crank one-eighth or, in extreme cases, even one-quarter of a circle before the center. As is shown in Figs. 1 and 2, with a connecting-rod whose length between centers is twice the stroke, these points correspond to about 0.82 and 0.44 of the compression stroke, respectively, the dotted lines A and B indicating the highest and lowest positions of the piston head.

But early ignition, though the most ob-

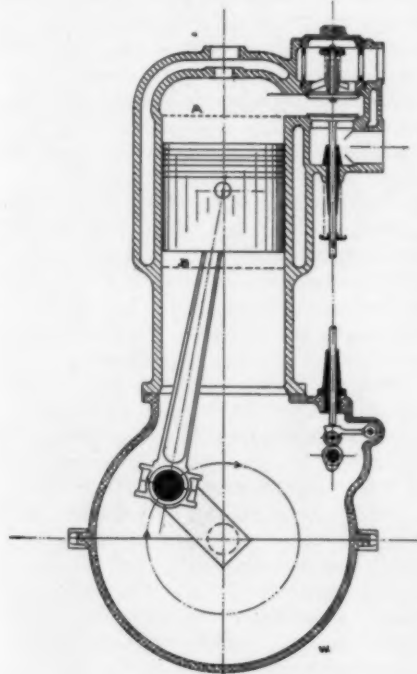


Fig. 1.

ple, that of gunpowder, because the gases resulting from combustion, instead of being of greater volume than the original mixture under like conditions, are, when

vious, is not the only means of hastening combustion. As above stated, the rapidity of combustion depends on four factors: the quality of the mixture—by which is meant both the richness of the fuel and the degree of closeness with which the chemically correct proportions of fuel and air, to secure complete combustion without excess of either, are approximated; the homogeneity of the mixture, or correctness of proportion in every part of it; the temperature of the mixture; and the pressure to which it is subjected. Under like conditions of temperature and pressure, that mixture will burn fastest which has the richest fuel vapor, and whose elements are the most thoroughly commingled before entering the cylinder. Again, a hot charge will burn faster than a cold one; but there are reasons—chief of which is that a cylinderful of hot gas is rarer than the same volume of cold gas, and will, therefore, give less power—why it is generally preferred to add as little outside heat to the charge as possible. A little must be added, especially in cold weather, to make up for the cold produced by the evaporation of gasoline and to insure complete vaporization; but this has nothing to do with the action inside the cylinder.

#### Advantages of High Compression

It remains, then, to accelerate combustion by raising the compression as much as feasible; and in automobile motors for high speed the compression is quite frequently carried as high as in the largest stationary engines for the same fuel—in other words, as high as possible without causing premature ignition of the charge by the overheating of metal surfaces projecting into the clearance space. Expressed in pounds per square inch, the practical limit of compression, where gasoline is the fuel, is about 100 lbs. absolute, which is given, with hot cylinder walls and a full charge, by a clearance space about equal in volume to 0.3 of the volume of the stroke. This, however, should not be taken as meaning that so high a compression is always desirable, as there are various mechanical objections to it, which will be discussed in the next article.

#### The Indication of Explosive Motors

On account of the abruptness of the explosion in a slow-speed engine, and the difficulty or impossibility of getting accurate results out of an indicator on an engine running over 800 or 1,000 revolutions per minute, an indicator card from a gas engine is apt to be misleading and is seldom resorted to as evidence of the internal action except in the case of stationary engines. The cards shown in Figs. 3 to 6 are selected from a number taken about two years ago by Prof. Wm. T. Magruder from a stationary engine of 6 inches bore by 12 inches stroke, running about 200 r. p. m., and using gas as fuel. Though from a slow-speed engine, they illustrate very well the effect of varying conditions on the internal processes.

Fig. 3 is a normal card. The length of stroke is represented by the line *a b*, which is also the line of atmospheric pressure, and the several operations of suction, compression, ignition, expansion and exhaust begin with the letters *a, b, c, d, e*, respectively. Compression is to about 85 lbs. absolute, and the point of highest pressure, *d*, indicates about 350 lbs. gauge. This is a higher pressure than could be attained in a faster running engine, and is possibly too high for best results in the engine in question, as the pressure falls off very rapidly before expansion has fairly begun. Figs. 4 and 5



FIG. 3.

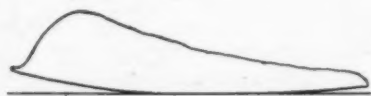


FIG. 4.



FIG. 5.



FIG. 6.



FIG. 7.

show the effect of retarded and premature ignition, respectively. In the former, combustion is not complete till well along in the stroke, and all the benefit of the high pressure early in the stroke is lost. In the latter the charge burns so rapidly as to cool and shrink before its pressure can be utilized in the expansion stroke, and the peculiar loop at the top of the card results. This loop represents negative work, and to obtain the net work done its area must be deducted from that of the rest of the card.

In Fig. 3, the line *m n* represents zero

pressure, or a vacuum, and similar lines in the succeeding figures give a basis for estimating pressures. Fig. 6 is a card of unusual area, taken from the same engine. It was obtained by feeding a slight excess of gas, and thus causing a slightly slower combustion and avoiding the sharp peak of Fig. 3. Fig. 7 is an ideal card, given to show the probable action in a high-speed engine. The curves of compression and combustion merge together, the maximum pressure is lower than in Figs. 3, 5 and 6, and combustion is not complete till about a third of the power stroke is passed. The maximum pressure, about 245 lbs. gauge, is a trifle higher than would usually be realized in practice.

(To be Continued.)

#### A STANDARD CHASSIS

With the growth of the automobile industry in France, the need has been increasingly apparent for a set of standard dimensions for the body space in the chassis, to the end that bodies on a given chassis could be interchanged if desired, and parts for body repairs ordered of the makers from stock, thus saving the expense of special work. From the manufacturers' point of view, another advantage was that, with all bodies made to standard dimensions, the makers of bodies could carry their product in stock, instead of building specially to each concern's order.

A committee appointed last winter by the *Chambre Syndicate* to investigate the subject and make recommendations, has submitted the following schedule of dimensions for the body space, the length being taken from the back face of the dash to the rear end of the frame, and the width from outside to outside of the side sills:

1. Voiturettes, 1.80 m. long by 0.80 m. wide.
2. Light Voitures, 1.90 m. long by 0.80 m. wide.
3. Voitures, 2.00 m. long by 0.85 m. wide.
4. Voitures de route, 2.50 m. long by 0.95 m. wide and up.

Approximate equivalents in inches for the above are:

1. Length, 70.87 or 70 $\frac{7}{8}$  ins.; width, 31.50 ins.
2. Length, 74.80 or 74 $\frac{13}{16}$  ins.; width, 31.50 ins.
3. Length, 78.74 or 78 $\frac{3}{4}$  ins.; width, 33.46 ins.
4. Length, 98.42 ins.; width, 37.40 ins.

The committee recommends that no part of the mechanism within the body space be made to come above the level of the scantling on which the body rests, in order to avoid cutting away the framing of the body or floor. It recommends in addition that the dash and the toe-board immediately back of the dash, and about 35 cm., or 13 $\frac{3}{4}$  ins. wide, be made a part of the chassis, and the body be begun at the back of this toe-board. Then the body can be removed instantly without taking down the steering column and pedals.



## Faulty Steaming



### BOILER AND PIPES

(Continued from June 7.)

1. Boiler contains too much water. E. An unusually obliging water glass may give you some idea of height of the water; the water column will show, the exhaust will sound wet, and water on the back track is conclusive if you have cleared the engine and exhaust passage of condensed steam, and the exhaust shows no froth.

R. Blow off until there are six or seven inches of water in the boiler, or shut off the pump and use up the excess.

2. Soot in the tubes and on the bottom of the boiler.

E. There may be no noticeable evidence, but there will have been a history of smoke.

R. Cleaning may be done by taking off the burner and wiping out the tubes with tools made for that purpose, though a piece of waste or cloth passed through an eye in the end of a piece of stout wire will answer every purpose; may be cleared after a fashion by means of a hose attached to an air blast or by steam hose. It is a disagreeable and tedious task, particularly with the swab, but in no other way can the job be thoroughly done. If you will, do it yourself, and take off both burner and hood.

3. Scale and dirt inside of the boiler. This is the "bete noir" of all engineers, and with boilers the size of those used in automobiles its formation may go on very rapidly, because these little boilers will evaporate an enormous quantity of water (I use nearly a gallon to the mile when carrying two people), and of the inorganic salts in the water, a certain proportion is left in the boiler. Visible dirt in the supply is inexcusable. E. With some kinds of dirt, the blow-off valve will disclose, but scale may not be thus shown, and is evidenced by eliminating the other causes of low steaming.

R. If you are young at the business, or over credulous, you will use some of the preventatives to be put into the water supply. This will help if the compound be fitted to the particular supply, but I believe that this is one of the exceedingly rare instances where the pound of cure is better than the ounce of prevention. To fit a preventive to a water supply involves a more or less complete knowledge of the qualitative and quantitative composition of the latter, and when all of this trouble and expense have been incurred, you are logically confined to that particular supply. This is manifestly impossible unless you are willing to remain within a radius of 10 to 15 miles of the supply.

For the removal of the scale I have tried

only a few things, because, when I got down the list to crude petroleum I was satisfied. This should be used as follows: Put out the fire, fill the boiler with water almost to the top, detach the water hose from the strainer, insert it into the petroleum and pump into the boiler from a half to one pint—you can't use too much. Then open the safety valve and allow the water to run out until the petroleum shows, close the blow-off valve and allow the carriage to stand for from 12 to 14 hours. Then fill the boiler with water, fire up, and with the safety valve open boil down as far as your nerve will permit, or until the lowest try valve on the water column ejects steam. Then turn out the fire and open the blow-off, allowing the dirty water to escape. This completes the operation for the time being, but you should blow off at least once a day until the water shows no discoloration. Don't put sal soda in the tank. I did this a long time ago and succeeded in making a thin and not particularly good quality of soap. I now blow off at least once a week.

4. Unseated check valves between the boiler and the water tank, or between the boiler and the by-pass valve. E. A loud bubbling, blowing or roaring in the water tank, with a great decline in the steam, as shown by the gauge.

R. A gentle tap with a wrench will usually reseal it; if not, take off the cap and clean. Caution: Check valves next to the boiler must not be thus opened while steam is up.

5. Oil or grease of any kind in the boiler. E. Exhaust is wet even with low water, is frothy, and froth may be seen in the water glass; cylinders may pound.

R. If the grease be known to be in small quantity, nothing need be done; otherwise it is best to blow off and inspect the water in the tank.

6. Leaks of steam between the boiler and the steam chest. E. Rapid loss of steam while standing, turn out the fire, hold the throttle tight, and it may be heard. Inspection will show the packing to be wet or blown off, but a leap from the by-pass will also cause it to be wet. If from the swing joint and the throttle be patent, the leak will manifest itself only when the throttle is open.

R. Evident. Use red lead or shellac.

(To be Concluded.)

### TAKE CARE OF THE BALLS

A large part of the trouble experienced with ball bearings by users of steam carriages—and of all others, for that matter—could be avoided by the simple precaution

of renewing the balls periodically, say once in a thousand or two thousand miles, without waiting for them to show signs of wear. Steel balls are very inflexible things, and the slightest wear, even if imperceptible to the eye, will destroy their rotundity and prepare the way for trouble. It is not a bad plan, also, to renew the cups and cones semi-occasionally, but as wear will not destroy the circularity of the ball track nearly so rapidly as it does the balls themselves, this does not require to be done so often.

Neither this nor any other precaution will redeem a bearing hopelessly out of line, exposed to dirt or too small for its work; but not even the best designed ball bearing ought to be left to take care of itself indefinitely, and by timely attention many doubtful members may have their efficiency improved and their life prolonged.

### MOTORS AND MOTOR DRIVING

Beginning with "Hunting"—in a broad sense the oldest of all sports—in 1885, the famous Badminton Library has this year reached its 29th volume in "Motoring," the lusty infant which has in so short a time won a prominent place in the favor of sportsmen of all nations. As in the previous volumes of this notable collection, the present one takes the form of a number of separate articles, each devoted to some one detail, which is treated by an expert. The moving spirit is that enthusiastic motorist, Mr. Alfred C. Harmsworth, who contributes an important chapter on the choice of a motor, and, in addition, has enlisted the services of the best British authorities. The history of the motor car is dealt with by the Marquis de Chasseloup-Laubat; the Hon. John Scott Montague writes of the utility of the motor car; Sir Henry Thompson writes of motor cars and health. The chapter on motor driving is by S. F. Edge and Charles Jarrott, while Hon. Charles S. Rolls writes of the caprices of the petrol (gasoline) motor. Among the other subjects treated are dress for motoring by Lady Jeune and Baron de Zuylen de Nyevelt; the petrol engine and its ignition; the petrol car, tires, steam cars, electric cars, motor cycles, roads, the laws affecting motors, clubs, literature and races and trials. The book is a complete encyclopedia of motoring as it is known at the present time, and though treated from a British standpoint, it is none the less valuable and interesting to American motorists. It is very fully illustrated by both diagrams and pictures. The American edition is published by Little, Brown & Co., Boston, in the familiar brown cloth binding, the price being \$3.50.

The experiments made with automobiles in the Russian army manoeuvres have had excellent results, and motors will from now on form a regular feature in military movements. One car of 6½-h.p. worked especially well and steadily, and covered no less than 1,066 kilometers during manoeuvre time.

\*The Fourth of a Series of Articles by Dr. Paul Norwood begun in the Automobile of March, 1902.



## MARINE MOTOR DEPARTMENT

### THE COUNTESS OF DUFFERIN

The launch Countess of Dufferin was built by the American Motor Company of Marion, N. J., last summer as a tender for the cutter Shamrock II., one of the many craft in the fleet of Sir Thomas Lipton in his second attempt to win the America Cup. She was used regularly through the summer and fall, carrying passengers and supplies about New York Harbor and the Lower Bay, and proved very suitable, being staunch and able and with ample carrying capacity. The design was made by Elmer E. Griswold, of Jersey City, who also planned and superintended the construction. The launch saw much rough service and was subjected to some hard usage, but she stood it satisfactorily. The motor is one of the stock 24-h.p. gasoline motors, with four cylinders, made by the Automobile Company of America for the Gasmobile motor carriage, and also used by the American Motor Co. for all its launches. The dimensions of the launch are:

Length—			
over all.....	40	ft.	
l.w.l.....	36	4	in.
Breadth—			
extreme .....	7	8	
l.w.l. ....	7	6	
Draft .....	2	6	
Freeboard—			
bow .....	3		
least .....	2		
transom .....	2	6	

The keel is sided  $4\frac{1}{2}$  ins. and moulded 6 ins. amidships, the stem having the same siding. The frames are all of steamed oak, sided  $1\frac{3}{4}$  ins., moulded  $1\frac{3}{4}$  ins. at heels and  $1\frac{1}{2}$  ins. at heads, spaced 12 ins. The floors are of 1-inch oak, each extending up to the lower side of the floor and spaced on every frame. They are fastened to the keel with  $\frac{3}{8}$ -in. copper bolts and to the frames with  $\frac{3}{4}$ -in. rivets. The garboards are 1 inch thick, of oak, and the balance of the planking is of white cedar, finishing  $\frac{3}{4}$ -in. thick and reduced to  $\frac{5}{8}$ -in. in rabbet. The plank fastenings are 3-16-in. copper rivets. The engine keelsons are 3 by 8 ins., and the floors under them are sided 2 ins. The shaft log is sided 6 ins. The transom, sheerstrake and planksheer are of cherry, the sheerstrake being 1 in. thick, tapering to  $\frac{5}{8}$ -in. at ends, and the planksheer being  $\frac{7}{8}$ -in. thick and 5 ins. wide. The clamps are of Oregon pine, sided  $3\frac{1}{2}$  ins., and moulded 6 ins. The combing is of  $\frac{3}{4}$ -in. cherry. The deckbeams are of spruce, sided  $1\frac{1}{2}$  and moulded 3 ins., spaced 12 ins. centers, the deck being of  $\frac{3}{4}$  by  $1\frac{3}{4}$  ins. white

pine. The model is well adapted for a cruising launch and there is room for a very good cabin.

### POWER IN COD TRAWLING

NEW HAVEN, CONN., June 18. (Special Correspondence.)—A newcomer at Westbrook, on the north shore of Long Island Sound, this summer, is Isaiah Watkins, an old Nantucket cod fisherman, who is having a fishing schooner built for himself "on the Cape," with which he will attempt the innovation of supplying the central and western Sound ports of Connecticut with fish the year round.

Mr. Watkins will use a 10-h.p. gasoline motor to help him out in this work.

For years he has been engaged in the Nantucket and Block Island cod and other fisheries (iced fishing) for the New York and Boston markets. He has found, as every one else has in this particular trade, that, barring an occasional lucky strike, he has caught the most fish when every one else has caught them, and, consequently, he has realized only the lowest prices, because his fish were in market just when those of his rivals were. He will now use the motor to put him ahead of competitors in getting out to the fishing grounds in calm weather. This will be a great aid, especially in cod trawling in winter at Block Island, where there is frequently a spell of two or three hours' calm in the morning, and by the time the fishing smacks reach the grounds a wintry gale comes up and drives them in at once before they have had a chance to wet a gear. Several of the smacks have already put in these motors for this purpose and for making haste to shipping points.

It is in the change of his markets that Mr. Watkins will also make another important use of the motor. He believes that by making regular trips to the larger central and western shore cities of this State with fresh fish he can get a trade that will be much more steady as to prices than that in the New York and Boston commission markets, and his commissions to the marketmen will be saved as well. The motor will help him to make his trips from the fishing grounds to his markets with regularity, and if at any time he has not a fare of fish when it becomes time for him to start for a market, he can always find a brother fisherman who would gladly consign fish to him to sell in this section. This part of the State is a favorite market for the salt water fishermen, but the trouble has been heretofore in getting the fish here quickly and cheaply.

The gasoline motor, Mr. Watkins thinks, will solve this problem.

### LAUNCHES AT DULUTH

MILWAUKEE, WIS., June 16. (Special Correspondence.)—A wonderful development in the progress and adoption of motor launches has taken place on the available portions of the Great Lakes since the advent into the commercial world of this contrivance. There is probably no better illustration of this fact than on the greatest of fresh water lakes, Lake Superior.

A few years ago there were no pleasure craft on this great body of water except those propelled by wind, and those who had a love for water sport could be seen perched on the weather rail of a sailboat, with the lee gunwale under the foam.

The sentimentalist who said that the locomotive and saw mill banished the nymphs from the forests, might also have said that the advent of motor launches drove sail and wind out of the business so far as sport is concerned, except, of course, among the habitual yachtsman. Even this class is now losing the idea that risk is the only exhilarating part of sport.

Duluth, Minn., and West Superior, Wis., are neighboring. There is a small division made by a bay between the towns, and this bay shows the inroads which gasoline, electric and other kinds of motor launches have made among the sportsmen.

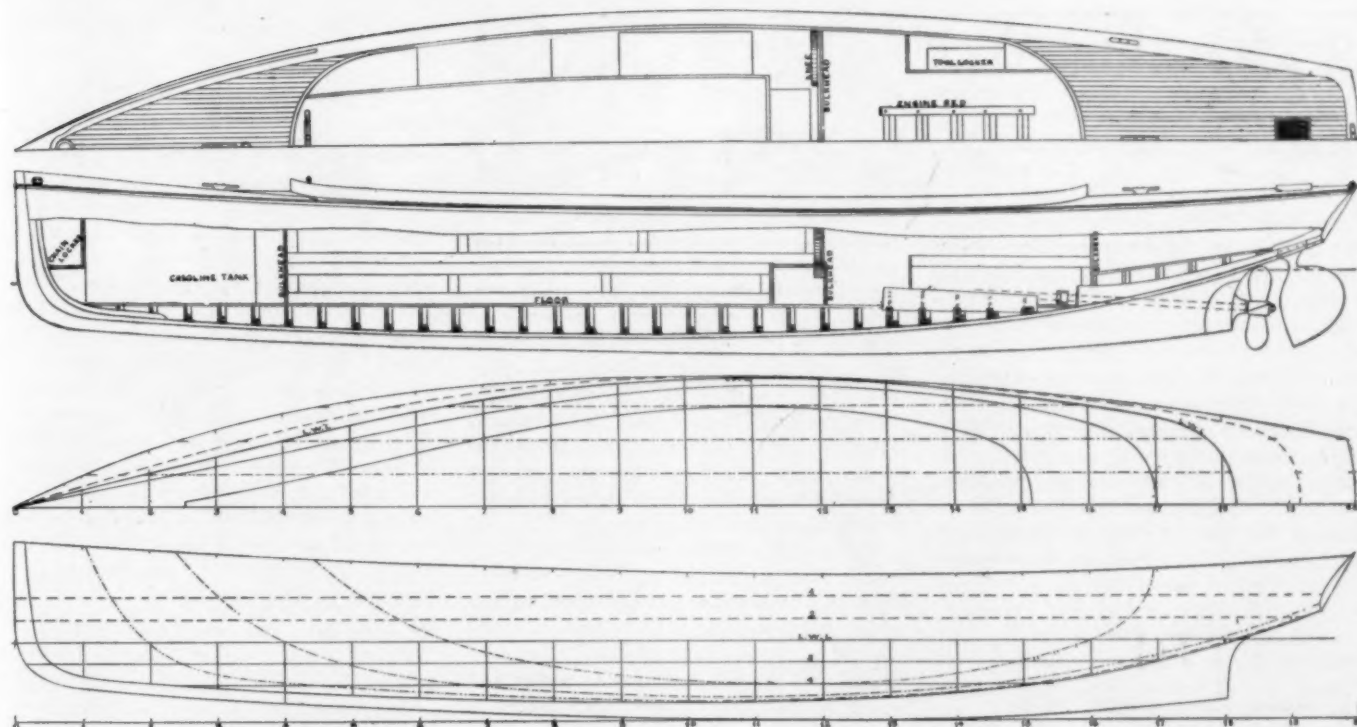
Most of them are of moderate size, costing from \$500 to \$1,000. In Duluth there are more than two dozen of them. West Superior probably is but very little behind. Gasoline launches predominate. The motors can be run by unlicensed hands, and the great saving in space is another strong incentive to the adoption of gasoline.

The most pretentious gasoline yacht on the bay is that of M. H. Alworth, of Duluth, Minn. This craft is the Nellie A. She is 52 ft. in length, decked and cabined, possessing every luxury desirable for a cruise. She was built by the Pearson Boat Co. at Duluth at a cost of \$11,000.

The Pearsons are also building two other boats. A 35-ft. craft is being constructed for A. W. Hartman, and a 30-footer for R. C. Vincent, both of Duluth. Each will cost, when completely fitted out, in the neighborhood of \$2,500.

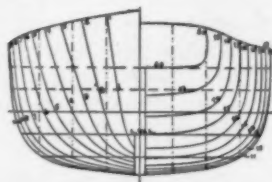
### PIRATES ON THE SOUND

NEW HAVEN, CONN., June 14.—(Special Correspondence.)—From information received here from the eastward, it is seen that the new class of thief has appeared upon the horizon—namely, the gasoline launch pirate. Two of them were frightened from Henry W. Holmes' launch May, at Stony Creek, on Friday night just as they were filing off some of the brass work and making ready to strip her. On the night before a gang of them boarded Thomas Donnellan's launch Quando, on the Connecticut River, at Haddam. They stripped the launch, stealing the engine and

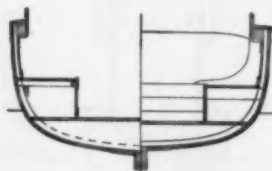


COUNTESS OF DUFFERIN, GASOLINE LAUNCH, DESIGNED BY ELMER E. GRISWOLD, 1901

everything else of value. In all about \$175 worth of plunder was taken and the launch set adrift. She was recovered. Thieves also boarded the launch of Dr. D. A. Williams, of Lyman Viaduct, and stripped her of metal and tools. There is no clue to the miscreants.



Captain Benjamin Clark, of Saybrook, on the west bank of the mouth of the Connecticut River, has arrived with his wife at Providence, R. I., on the auxiliary sloop Hunter from Florida. This is the eighteenth season, it is said, that the Clarks have made the trip to Florida, keeping on the inside route as much as possible. While in Florida Captain Clark fishes much of the time, and he has returned North with his



boat loaded with conch shell and curios. Mrs. Clark is an excellent sailor and is much attached to her marine home.

William H. Hudson, of the adjoining town of Branford, while coming east from New York with an auxiliary yacht he has just purchased, was caught in a gale of wind off Captain's Island, where his yacht was

disabled. The gasoline gave out, the engine stopped and the craft very nearly pitchpoled in the heavy sea. She was finally picked up and towed in by the schooner yacht Endymion, which left her at Riverside, in this state. Many yachts were dismantled by the same blow in this section.

A. J. Wakeman, of Green's Farms, has put his fine motor boat Mathella in commission for the season. A new launch in New Haven is the Alfaretta, 30 ft. long and owned by Alfred W. Clark. The 25-ft. launch Chief, owned by W. W. Burr, of Stamford, has been launched.

At Stamford the auxiliary boats are more than ever popular this year. The Waterbury Bros.' launch Frolic has been put in commission; Walter Bradley is making an extended cruise in the auxiliary Vitesse; the handsome new 60-ft. naphtha launch of McMaster Mills, president of the Plaza Bank, New York, is anchored in the harbor, and the roomy sloop Ariel, owned by Smith Bros., is being fitted with a new 3 h.p. gasoline engine.

A half-ton keel has replaced the centre-board on the Stamford auxiliary St. Elmo. A. H. Austin has a new 25-ft. 4 h.p. launch there. The Stamford Motor Co. is to send a 22-ft. launch to J. G. Turnbull, of Barton Landing, Vt., for use on a Vermont lake, and one also to George L. Crossman, of Saco, Me.

The acting secretary of the treasury has submitted to Congress an estimate of appropriation of \$800, for inclusion in the urgent deficiency bill, for the purchase of a steam launch for the use of the penitentiary at McNeil Island, Washington. It is explained that a launch or some similar conveyance for the purpose of transporting prisoners

between the penitentiary and the mainland is absolutely necessary. The vessel which has heretofore been used is the private property of the ex-marshal, and his successor in office is without any means of transporting the prisoners. The committee on appropriations has the matter under consideration.

Penelver, auxiliary schooner, recently purchased by A. D. Claffin, of Boston, had a narrow escape from destruction by fire on June 10. She was bound east from Newport in a strong S.W. breeze, when the steward, in preparing breakfast, caused an explosion of gasoline from the galley stove. The yacht at once headed inshore and for half an hour her crew fought the fire. It was finally extinguished and the yacht was again headed on her course for Vineyard Haven, where she arrived safely, but with her interior badly damaged.

The D. M. Tuttle Co., of Canastota, N. Y., launched on June 6 a gasoline launch, the St. Charles, for L. B. Chesebrough, of the St. Charles Hotel, at Sylvan Beach. She is 52 ft. long, with a 35-h.p. motor. She will be used on Oneida Lake this summer and probably in Florida next winter.

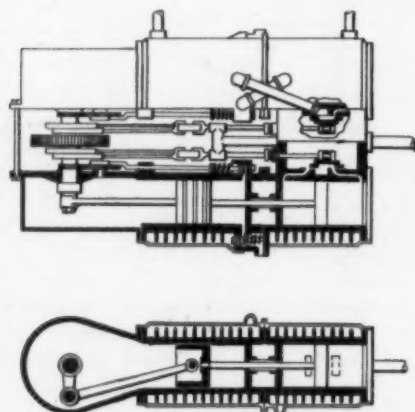
John Himmelein, proprietor of the Ideal and Imperial stock companies at Sandusky, has received a fine 32-ft. launch built by the Lozier Motor Co., of Plattsburg. She will accommodate thirty people, and will be used in taking pleasure parties from Sandusky to the neighboring islands in Lake Erie.

Alvina, steam yacht, Clement A. Griscom, sailed from New York for Southampton on June 8. Her owner will join her there and attend the coronation ceremonies off Spithead.

## The Week's Patents

### PATENTS ISSUED JUNE 10

The majority of the motor vehicle patents issued June 10 relate specifically to internal combustion motors. Three of these are described and they represent respectively three of the important lines along which the development of the gasoline engine is proceeding. One is of radical construction, creating a new type; another aims solely at improvement in the usual form of four-cycle motor, while the third has for its object the production of a two-cycle motor operative on kerosene or other low grade fuel. Sadly enough, in view of the oft expressed



Dieter and Orum's Combination Engine

desire for a new type which will obviate entirely the difficulties of the present practical types, the first of the three inventions is not only radical, but hardly within the range of practicability.

#### COMBINATION MOTOR

Letters patent No. 701,857, dated June 10.—William Dieter, of Brooklyn, N. Y., and Hartvig Orum, of Chicago, Ill.; said Orum assignor of his right to Irving A. O'Hara, of Brooklyn, N. Y.—These inventors have sought to combine the respective advantages of gasoline and steam as sources of power for automobiles, and have probably overlooked the fact that most vehicle owners have enough trouble with either power without having the disadvantages of both combined in one vehicle. At any rate, they have created a motor of the type which represents an attempt at the production of something radical rather than of something available in practice.

The patent specifications present a double cylinder motor. Each side of the motor comprises two cylinders in line with each other, one for steam and one for internal combustion. Between the two is a steam jacket, and surrounding each are fins, such as used on ordinary air cooled gasoline motors, and also an enclosing jacket or casing. The two pistons are positively con-

nected, as shown in the illustration. The steam cylinder is provided with the ordinary steam chest and slide valve gear, while the hydro-carbon cylinder is likewise provided with the customary valves and mechanism for controlling its source of impulse. The exhaust from the steam cylinder leads into the jacket surrounding the hydro-carbon cylinder, and is exhausted after passing through it. Likewise the exhaust from the hydro-carbon cylinder passes through the steam cylinder jacket before being finally discharged.

The motor is to be ordinarily started on steam, after which the hydro-carbon cylinders may be thrown into operation to run either in connection with the steam cylinders or with them shut off. It is thus professed that a great elasticity of power and speed is obtained. The exhaust steam is supposed to serve as a cooling medium for the hydro-carbon cylinders and the passing of both exhausts through jackets in which are annular ribs is supposed to produce the effect of a muffler. Live steam turned into the steam jacket between the two cylinders of each side of the motor is further supposed to cool the head of the hydro-carbon cylinder.

#### TOO LATE FOR BROAD PATENT

Letters patent No. 701,891, dated June 10.—Cadwallader W. Kelsey, of Philadelphia, Pa.—The invention specifies a construction of exhaust valve operating parts which, although never widely used, was brought out in Europe several years ago and which possesses several points of merit that may yet bring it into more or less common use. One of these is that it obviates the two-to-one gearing, unless this is used solely to operate the ignition device; another is that it permits the reduction of the total width of the crank casing without reducing the crank shaft bearings, an advantage which is most desirable in the construction of motors for bicycles.

The exhaust valve stem is provided with a central shoulder against each of whose faces bears a coil spring. The upper spring is, of course, intended to keep the valve in its closed position except when mechanically opened. The lower spring bears against a flange on the upper end of a sliding spindle projecting from a bearing in the crank casing. This flange encloses a socket into which the end of the valve stem extends. The lower spring thus tends to keep the spindle normally in its lowest position and out of end contact with the valve stem.

The inner end of the sliding spindle is provided with a fork in which is hung a roller that registers laterally of the motor with the periphery of one of the fly wheels. In the periphery of this fly wheel is cut a

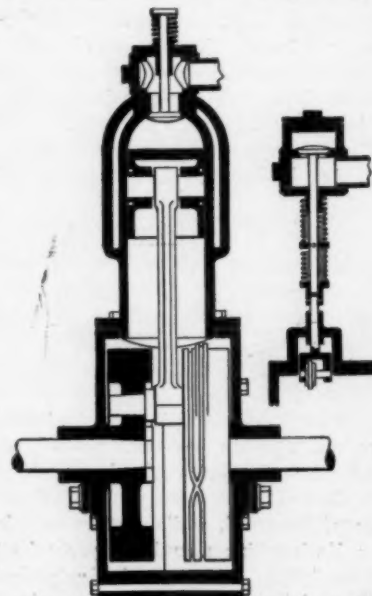
figure eight cam groove, a little less than half of one section of which is raised above the surface of periphery. The rest of the groove is of uniform depth below the periphery. It is obvious that in traveling through this groove as the fly wheel rotates the roller will once for every two revolutions be run over the raised or cam portion. Its spindle is lifted accordingly and presses against the end of the valve stem, thus opening the exhaust valve.

Application for the patent having been made only last year, and thus after the broad principle of this construction had already been put into use, and probably patented in some similar form in this country, as well as in Europe, the inventor's claim is necessarily limited to the exact construction specified, which includes the use of the double springs on the valve stem and the central shoulder of the latter to separate them.

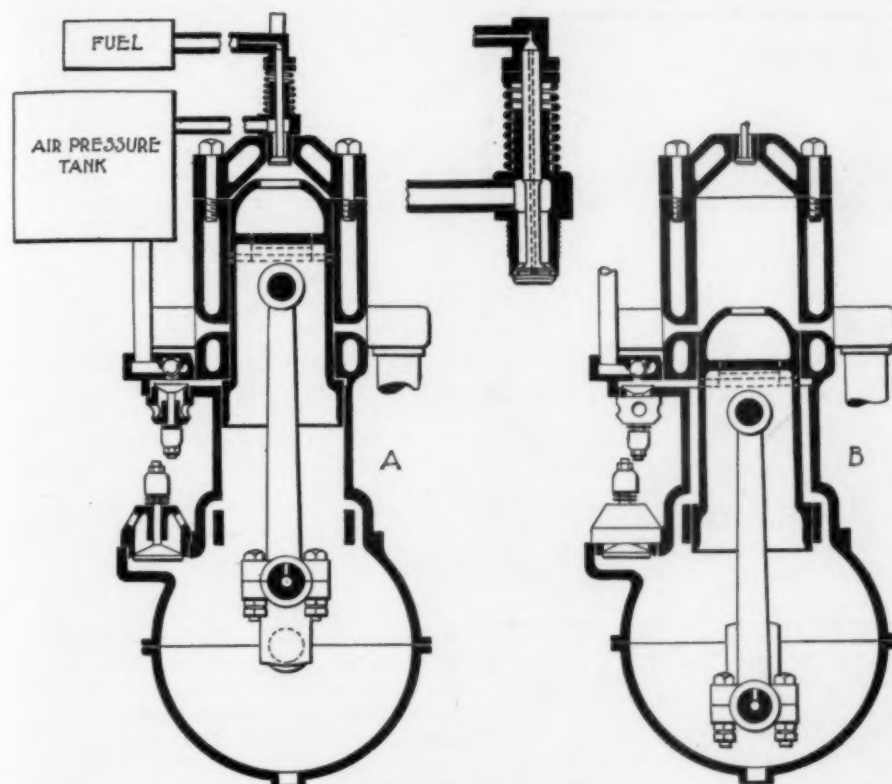
#### TWO-CYCLE MOTOR

Letters patent No. 702,375, dated June 10.—Frank L. Nichols, of Brooklyn, N. Y.; assignor of one-half to Walter W. Bostwick, of Brooklyn, N. Y.—The object of the inventor is to produce a two-cycle motor which may be operated on a low grade of oil such as kerosene. The inlet valve is placed vertically in the center of the cylinder head and is connected with an air pressure tank and with a fuel reservoir. The connection with the fuel reservoir is by means of a pipe leading into a box or chest above the valve so that the fuel—which is supposed to be forced into the chest by a pump timed in action to accord with the action of the valve—will be fed into a central, longitudinal hole through the valve stem. From this it issues into an annular groove channel in the valve face so that the rush of air around the valve will atomize the fuel as the mixture and induction occurs.

The long cylinder has a double bore, the larger being that of the portion adjacent



Kelsey's Cam Groove Exhaust Lift



NICHOLS' TWO-CYCLE MOTOR

to the crank chamber. The piston is likewise of double diameter to operate within both sections of the cylinder. The exhaust ports are placed near the bottom of the small bore portion of the cylinder. By-passes connect the crank chamber with the large bore portion of the cylinder while at the point where the two bores meet a groove and passage connect with an outside valve chamber. In this chamber is a ball check valve and a puppet valve, and from it extends a pipe leading to the air pressure tank. On the side of the crank casing is another puppet valve. In the piston head is a passage—shown by dotted lines—which registers with the central groove passage when the piston is in the position shown in view B of the accompanying illustration. This cross passage meets an opening cut through the piston head, which is capped on a dome-shaped rib. If, after the starting of the motor, the explosions heat it sufficiently this rib may serve as a self-igniter for the motor in the place of the electric ignition device used when starting the engine.

On the upward stroke of the piston the valve on the side of the crank chamber is opened by suction and fresh air drawn into the chamber. On the downward stroke the other puppet valve is opened and air drawn in back of the ball check valve so that on the return stroke it will be forced past the ball check and into the air tank to maintain the pressure in that tank.

After the first impulse the downward stroke of the piston compresses the air in the crank chamber. When the piston nears the end of the stroke its enlarged portion moves past the by-passes into the enlarged

portion of the cylinder and the compressed air within the chamber rushes upward through these by-passes into the central groove, through the registering cross pass in the piston head, upward through the piston head and is thrown against the dome-shaped top of the combustion chamber. It is then deflected downward and drives the product of combustion through the exhaust ports. The upward movement of the piston closes these ports after the exhaust has occurred.

The speed may be regulated by gauging and throttling the inlet of air and fuel. The inlet is mechanically operated by suitable connections from the crank shaft.

#### OTHER PATENTS ISSUED JUNE 10

Letters patent No. 702,090; J. Frank Duryea, of Springfield, Mass.—Inlet valve governing mechanism for internal combustion motors.

Letters patent No. 702,271; William F. Williams, of London, England.—Elastic solid tire.

Letters patent No. 702,246; J. S. Rogers, of New York, N. Y.—Internal combustion motor.

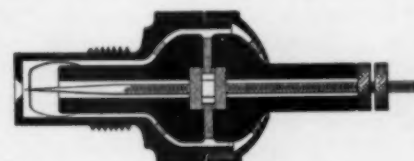
Letters patent No. 701,909; Jonathan D. Maxwell, of Detroit, Mich.—Construction of side spring running gear.

#### THE "SPIT FIRE" SPARK PLUG

The accompanying illustration presents a sectional view of a jump spark plug, which is unique in construction and which is now being generally introduced. It is called the Spit Fire and is manufactured by Arthur R. Mosler, 309 Broadway, New York. The appellation Spit Fire has been given it be-

cause of a peculiar ignition action which it is asserted results from the use of a hood over the sparking point. The plug casing extends as a tube beyond the end of the porcelain core and terminates in a cross wall a short distance beyond the point of the electrode. This wall is pierced by a small beveled hole, whose edge forms the other pole of the current. The action which is averred to occur is that, because the space within this hood forms a small combustion chamber in which the gas will be first ignited, a flame of burning gas will be projected through the end opening to ignite the entire charge. This extension of the casing also serves to protect the porcelain from oil which might by accumulation on the hot porcelain carbonize and tend to create short circuiting.

As shown in the sectional illustration the central rod or electrode is a threaded pin, upon which the porcelain core is placed in two sections. Between the porcelains are three layers of mica washers. Within the central layer is embedded a small nut screwed onto the rod. When the porcelains are pressed together by the union of the casing and its outside cap ring or nut, the central layer of mica washers is bound tightly in position between them, and hence the nut within is prevented from turning. The direct locking of the nut allows the pin to be screwed inward or outward after unloosening the binding nuts on its outer end. This feature is important, as it serves to afford means for accurately and delicately adjusting the point of the pin to gauge the length of the spark. As all parts of the plug are held in position by the thread-



Mosler's Spark Plug

ed union between the casing and the cap nut the plug is readily separable. No cement is used in its construction. The porcelains, which, incidentally, are interchangeable, are relieved of direct bearing pressure against the casing walls by light packing rings.

#### EXPORTS OF AUTOMOBILES

Exports of motor vehicles and parts from the United States for the month of April, the latest period for which official figures have been compiled by the Treasury Department, were valued at \$151,199. From July 1, 1901, up to and including April, 1902, the total exports reached a valuation of \$668,731.

Exports from the port of New York for the week ended June 7 were as follows: Hamburg, 2 pkgs. motor vehicles, \$300; Havre, 1 pkg. motor vehicles and parts, \$675; Mexico, 8 pkgs. motor vehicles, \$1,518; Southampton, 4 pkgs. motor vehicles, \$1,000.



### THE BAKER ACCIDENT

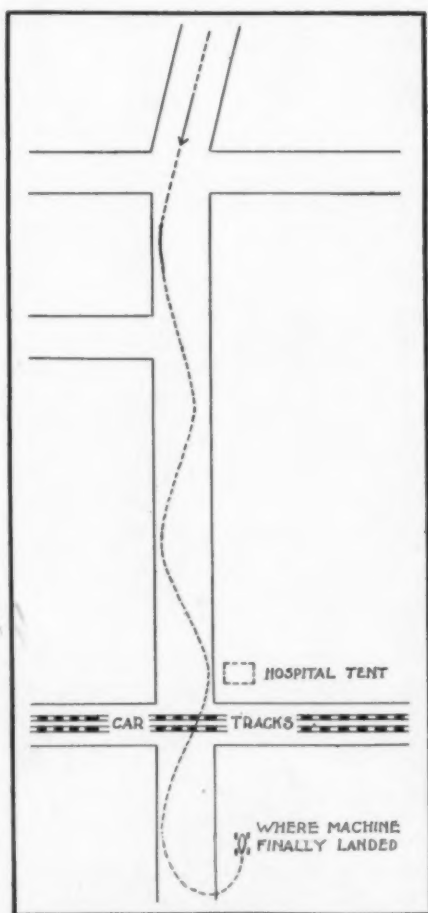
NEW YORK, June 16.—*Editor THE AUTOMOBILE AND MOTOR REVIEW:* My impression of the recent unfortunate Baker accident, of which I was a close witness, differs slightly from that presented by the diagram in the June 7 issue of *THE AUTOMOBILE AND MOTOR REVIEW*. It must be understood that the course consisted of a broad, flat dirt road, with a narrow strip of well arched macadam in the centre. The Baker machine held to this macadam strip until the turn just beyond the kilometer mark. It is probable that no machine ever attempted to negotiate even a slight turn at the speed that the vehicle was then making, the rate at that time being 58 seconds to the mile.

The machine continued its straight line at the turn until it had left the macadam strip and was on the dirt. It was steered toward the center of the road, and at any ordinary speed would have been able to run up on the macadam and stay there, but at this terrific gait the front wheels left the ground as soon as they struck the arch in the macadam, so that a quick turn on to the straight line of the macadam road was impossible, and a swerve to the opposite side of the roadway resulted. Mr. Baker says that feeling this undulating motion he shut off the power at this point. The next attempt to get on the macadam had a similar result and they swung again to the right-hand side of the road and again to the left; each time swinging a little further toward the gutter, this last turn bringing them nearest the gutter at a point close to the hospital tent. This series of jumps in crossing the arched macadam strip produced the undulating motion of which Mr. Baker speaks as being like the motion of a boat in a seaway.

In swinging from the hospital tent toward the road the trolley rails crossed the roadway. The rails had been covered with earth on a level with the macadam, but at the point near the gutter, just where the machine crossed, the rails projected an inch or two above the roadway, causing a jump, which enabled the spectators to see the under side of the machine as the front was raised in the air. This more violent motion led Mr. Baker to throw the brakes on the power, the indicator showing a rate of 46 seconds to the mile. The result was an ordinary everyday skid from the right of the road, where all four wheels touched the ground after the brakes were applied, across the road and to the left side of it, as marked on the accompanying diagram. Naturally the right-hand wheels collapsed under the

strain of the skid, the axle digging into the earth so heavily that it reduced the speed of the car, so that it ran only 25 or 30 feet after hitting the ground. This sudden reduction of the speed accounts for the very small death rate. Had the brakes held quicker, the machine would have cut diagonally through the thickest of the crowd in the so-called park for automobiles, at a rate of close to 46 seconds to the mile, insuring a death list of an appalling proportion.

It is difficult to see how the accident could have occurred in any other way without



causing a much more appalling catastrophe than that which actually took place.

In a perfectly straight, absolutely flat course there is little question that the machine would have placed the world's record at so low a figure as to defy competition, possibly for years, except, perhaps, by the same machine, as it was not going very fast at the flying start, due, I believe, to Mr. Baker's desire to simply beat the record and hold the full power of the machine in reserve for the purpose of going after the

record again each time that some other make might equal or excel his own record.

It seems reasonable to assume that on a flat, straight course there would be little unusual danger in operating the machine at its full speed. It seems equally likely that the machine could have made the mile in 35 seconds under such conditions, for at no time in this test were there used over 60 volts of the 90 volts available.

I do not believe that anything gave away until the skidding caused the collapse of the wheels, and it is not likely that wheels could be built strong enough to stand such a strain as was placed upon them, which leaves it impossible for anyone to say positively that the wheels used were not made strong enough for the work they were intended to do.

H. C. C.

### HORSE OR AUTOMOBILE?

NYACK, June 14.—*Editor THE AUTOMOBILE AND MOTOR REVIEW:* The numerous accidents resulting in many cases in the killing or serious injury of the occupants of horse drawn vehicles present the question in quite a serious light. Can the horse and the automobile use the common highway in harmony? Or must such familiar use be a continued menace to life and limb and disturbance to the peace of mind of the human users of the rival means of locomotion? Judging from recent events, anyone who presumes to take a drive upon the public highway takes his life in his or her hand unless the reins are handled over the back of a deaf, dumb and blind animal, or the driver has unusual mastery over the fickle beast.

I have had three years' experience operating an automobile of a very mild and inoffensive type and have always used the utmost precaution to avoid trouble; but for all that, my heart is seldom out of my mouth long at a time while on the road. None of the so-called precautions against frightening horses are of the slightest avail. To stop when signaled to do so, or when a driver is in trouble, has the reverse of a good effect upon the frightened animal. In the case of a gasoline vehicle, which makes more noise when stopped, it is usually a case of the last straw, and the horse is sure to bolt. The only sensible rule is get by as soon as possible. The only justification for stopping is that it does not look quite as heartless as to rush by leaving people in serious trouble and danger. However, go by; then walk back and give whatever assistance is possible. The main point is, get the "monster" out of sight quickly.

The average chauffeur understands his machine and its operation much better than the average driver of the horse understands the idiosyncrasies of his animal; and the cases of criminally poor management of horses that an automobilist sees in a few hours' drive are quite numerous. The loosely dangling reins, for instance; the "Whoa! whoa! Jenny; it won't hurt you,

Jenny," while Jenny is turning around in the shafts, would be quite a comedy if it were not liable at any moment to turn into tragedy.

Every one who is not familiar with automobiles has a different theory as to what horses are afraid of in an automobile. It is the noise, the steam, the smell, the sight of a carriage moving without a horse, etc., etc. None of these theories consistently account for horses being frightened and attempting to escape from a barn in which an automobile backed up nearly out of sight in one corner, surrounded by other carriages, covered with dust and whose tanks and pipes have contained no gasoline for months, was stored.

Horses are frightened because they are. The same horse will go to sleep beside a monster gasoline machine one day, perfectly undisturbed by its noise and smell, and kill himself the next at the sight of a little electric runabout.

In view of these facts—and facts they are—what is a poor man to do, unless he wishes to have quite a number of accidents laid at his door, making enemies of former friends and creating endless dissension in the neighborhood? Fast and reckless driving is to be discouraged, but that it causes any more runaways than quiet, careful driving, I doubt. Horses will not get used to automobiles to any great extent for centuries. The delivery wagon horses, whose usual and daily route takes them in the vicinity of a large automobile factory, where from ten to twenty cars are under way all the time, are just as afraid and cause as much trouble after four years' experience as they did the first day they saw a motor carriage.

The horse's demeanor can only be accounted for in one way, which will consistently account for all his moods. He dimly realizes that the new vehicle means his economic doom, and as the notion takes him does all he can to queer the game. This instinct is sometimes dormant and everything is lovely. At other times the sense of his doom rushes through him in a wave of reckless despair. Then, look out!

H. L. PUTNAM.

#### SOMERSAULT AUTOMOBILING

NEW HAVEN, Conn., June 15.—*Editor THE AUTOMOBILE AND MOTOR REVIEW:* One of the odd things that an automobile will do occurred in Derby, to the north of this city, a few days ago, and it is worth reporting that automobilists may profit thereby. A gasoline vehicle was turned over on its side as quickly as a flash while running, and had two of its wheels twisted out of shape, its top broken off and the dash knocked to pieces. The accident was caused by the driver making too sharp a turn with the vehicle while running at a high rate of speed. The auto was a gasoline vehicle, and the driver, who was apparently the owner of it, refused to tell who he was. The handsome vehicle was badly scratched

in addition to the injuries already spoken of, but altogether the machine escaped luckily. Its driver also escaped without injury, and as he turned off the fuel feed after the upset, no damage resulted from burning gasoline.

It is reported here that a steam carriage was made to do a similar trick in Providence, R. I., recently. It "turned turtle" completely and stood on the top of the dashboard and the back of the seat.

DAVID S. ADAMS.

#### STORAGE BATTERY POINTERS

CLEVELAND, O.—*Editor MOTOR REVIEW:*—Below are a few pointers concerning the care of Willard automobile storage batteries which may be useful to some of your readers:

Be sure the electrolyte covers the plates at all times and in all cells.

Always open the carriage body while charging the battery.

Never light a match near the battery while charging.

Never "spark" the battery while charging.

Always recharge promptly after using the carriage.

Avoid heating the cells in charging.

On receipt of battery charge to 2.6 volts per cell at an 8-hour rate.

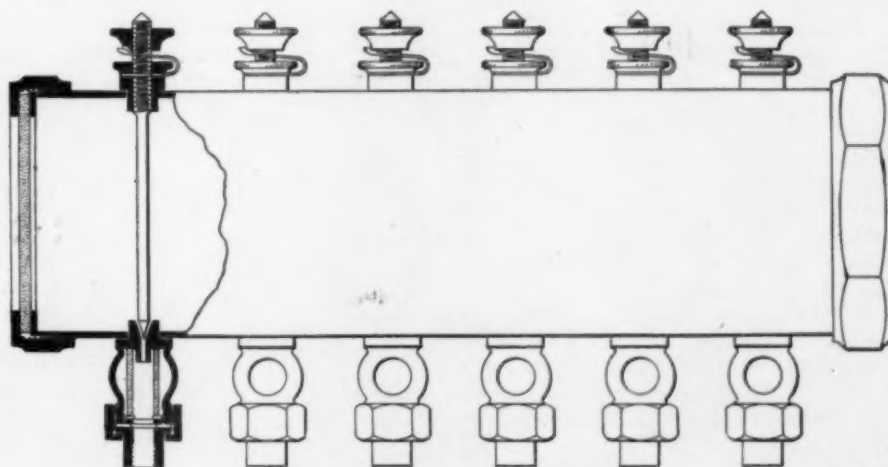
Never charge beyond 2.6 volts per cell at the 8-hour rate.

Overcharge for 12 hours at the low rate once each month.

Replenish electrolyte for loss in ordinary use with a solution of one part of sulphuric acid in ten parts of water.

When the loss is due to spilling in shipment use one part of acid to four parts of water.

Handle the trays carefully. A short drop will break a cell. WILLARD BATTERY CO.



HALL'S MULTIPLE GRAVITY LUBRICATOR

#### GRAVITY FEED OILER

Device with Simple Method Whereby the Normal Flow of Oil Can be Closely Adjusted and Adjustment Retained Permanently

One of the multiple lubricators made by the Hall Mfg. Co., 40 Cortlandt St., New York, is shown in partial section in the illustration herewith. The device does not present any new or radical principles of lubrication, but is a plain, gravity feed appliance of simple construction and with several ingeniously conceived details which render its adjustment and operation accurate and reliable.

The oil feeds from the reservoir into the sight feed chamber through an ordinary needle valve, whose spindle is controlled by a thumb nut at the top. Underneath this nut and screwing onto the stud within which the spindle is screw threaded, is a second nut binding upon the lower arm of a U-shaped spring. The upper face of this spring is formed with an end projection adapted to engage a notch in the under face of the regulating thumb nut. When first setting the lubricator for use, the lower nut is loosened and the spring turned to engage the notch in the upper thumb nut when the

latter is in a position which affords the desired normal flow of oil. The lower binding nut is then screwed down tightly, so that the spring will be locked in position. It is obvious that the thumb nut can then be turned to shut off the oil feed, and when reopened and turned until it again engages the spring, it will supply exactly the same flow of oil as before. Also, the valve may be still further opened to supply an additional flow when needed and can be always turned back to the adjusted point for furnishing the normal feed.

The glass within the sight feed chamber is secured by a narrow binding ring or internal nut, which is screw threaded into the end of the chamber. Between it and the end of the glass tube is a cork washer, and on its outer face is another cork washer that receives the pressure of the coupling piece, which is retained by the exterior flanged locking ring. An oil tight union is thus secured.

The Hall company does not limit the manufacture of the lubricators to the exact pattern shown, as the multiple oilers are furnished with any desired number of feed pipe connections. Also numerous other styles of lubricating devices are made.



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SATURDAY, JUNE 21, 1902

**"GAS ENGINE" NOMENCLATURE**

Unlike the steam engine, whose principles and method of operation are familiar in a general way to all persons of average intelligence, the "gas engine"—so-called—is as yet but little known to the public. The introduction of the gasoline launch some fifteen years ago brought this comparatively new power to the attention of yachtsmen, and the motor vehicle has, within a much more recent date, attracted general attention to it. At the present time the "gas engine" is the subject of study by many who have no direct interest in engineering or mechanical pursuits, but who find it necessary to familiarize themselves with an everyday machine of the greatest possible utility as a propelling power for all classes of land and marine vehicles. Until he comes to the actual adjustment of valves, proportioning of mixture and those trials of the flesh included under the comprehensive term of "ignition troubles," the greatest difficulty which the student of the "gas engine" experiences is that due to the faulty and limited nomenclature of the entire subject.

The principles and the mechanical details of the typical "gas engine" are hardly more complicated or more difficult of comprehension than those of the simple steam engine, but, unlike the latter, they are obscured by indefinite or incorrect terms. Looking first at the "gas engine" as a distinct type of motor, the name is very vague and indefinite. It has one meaning which is correct, that of a motor operated by the explosion of a gaseous mixture within the

cylinder; but it is used with equal frequency and propriety to indicate a motor in which this gaseous mixture is composed of coal gas and air. The term "steam engine," on the contrary, has but one meaning, a motor operated by an expansive vapor generated in an independent vessel outside the cylinder. It is in one sense perfectly proper to apply the term "gas engine" to a motor operated by mixtures of kerosene, gasoline, benzine, alcohol or even by a charge of gunpowder; but this use of the word causes endless confusion, even to the initiated.

There are three other terms which are practically synonymous with the broader meaning of "gas engine"; these are "hydrocarbon," "explosion" and "internal-combustion" motors. The first of these refers to the fuel, the material from which the explosive gas is generated, which is in the great majority of cases a hydrocarbon product, derived from some form of petroleum. The second and third are derived from the method of operation, the explosion or combustion of a charge of fuel within the cylinder. The best of these, so far as accuracy of definition is concerned, is "internal-combustion motor," but the length and unwieldiness of the term have limited its use mainly to textbooks and similar technical treatises. In every-day practice it is far more convenient to speak of a "gas engine," a "gasoline motor," "petrol motor" or "kerosene engine," even though the term is indefinite and may be incorrect. In the ordinary phraseology, as applied to motor vehicles, even of experts and technical committees, vehicles are classed simply as "steam, gasoline and electric." It is a fact that at the present time the great majority of the second class do use gasoline for fuel; but sooner or later, according to the progress made by experimenters with kerosene, alcohol and other fuels, the term "gasoline motor" must be abandoned in favor of something more exact and definite. For the present the novice may understand that all of the terms above given refer to a specific type of motor in which the fuel, in separate small charges, is introduced into the cylinder and exploded there, the expansion of the resulting gas forcing the piston outward.

When it comes to the immediate details of operation which distinguish one type of explosion motor from the other, a new source of confusion is found. These two types differ from each other in the number of individual operations going to make up a complete cycle or sequence, in one case four separate strokes being required and in the other but two. By some strange perversion of language, the terms coined by the early investigators were "four-cycle" and "two-cycle," which can only mean that four or two complete sequences are involved. So far from this being the case, the fact is that the so-called "four-cycle" motor is one in which four strokes are necessary for the completion of the full sequence of operations: the drawing in of the charge, its compression, its explosion

and the resulting outward movement of the piston, with a final clearing of the cylinder of the unconsumed gases. In a similar way the "two-cycle" motor completes its cycle in but two strokes of the piston.

To any one familiar with the true meaning of the term "cycle" the introductory chapters of the works on the internal-combustion motor are most confusing, as they give an entirely false idea of the true conditions. It is only after a close study of the details of the four successive operations which are involved in each type, and the understanding of the fact that in the "four-cycle" motor a separate stroke of the piston is required for each operation, while in the "two-cycle" type the induction and compression are accomplished in one stroke and the expansion and cleansing in a second stroke, that one realizes the actual conditions; that it is not a question of four or two series of operations, but of a single series accomplished through either four or two distinct movements, as the case may be. Even at this comparatively late day, when the old terms are deeply rooted in the history and the technique of "gas engine" engineering, it would be a decided gain if they could be replaced by something less positively harmful, as, for instance, "four-stroke cycle" and "two-stroke cycle."

**DANGEROUS DOCTRINES**

It is now nearly a generation ago that the New York *Herald* achieved a sudden notoriety of the saffron kind by what is still remembered as its wild beast scare. In a full page with flaming headlines it told, to the terror of many in the city and the suburbs, of the sudden breaking out of all the animals in the city's zoological garden, then in Central Park, and of their attacks upon men, women and children in the streets of the city. The semblance of truth was preserved through six columns of sensational story, only the final line announcing in small type that it was what would now be known as a "fake."

The record thus made for a wanton abuse of all the rights and privileges of legitimate journalism has been often imperiled, but never so dangerously as by the *Times* in its present crusade against the motor vehicle and its users. This paper, which has long stood as one of the most decent and responsible of the New York dailies, and the furthest removed from all taint of modern yellow journalism, has of late devoted itself to attacks of the most rabid and violent nature upon users of automobiles as a class, urging extreme and illegal measures against them. The ordinary sensational automobile stories of certain journals which glory in the title of "yellow" may be discounted to a certain extent, as the same treatment is served out impartially to all matters of daily life, but the *Times* has departed from traditions and usages of a lifetime in order to harry and abuse all motorists.

It was evident from the more moderate tone of a later editorial that after its intemperate attack upon the Automobile Club

of America, in connection with the recent speed trials, it was in some way brought to a partial realization of the fact that it had gone too far; but it has since broken out anew in extenuation if not actual laudation of such attacks as that upon Mr. and Mrs. Thomas. It is not necessary to quote in full from an editorial in the *Times* of June 16, but the following paragraph is a fair sample of the article and of many which have preceded it:

"The millionaire who finds his racing machine dented and scarred may think he has a grievance, but considering what people of his class or their imitators have done and are daily doing to make the automobile terrible, he would do well to devoutly give thanks that the dents and scars are not on his own head, where, to tell the plain truth, they would usually do most good."

To pass from the serious side of the question to a lighter, last week a man who was annoyed by the persistent playing of ping pong by others in the same house, armed himself with a revolver, and the services of a policeman were required to prevent him from annihilating all the players. It would be interesting to know whether the *Times* would uphold him in applying its doctrines to other sports than motoring and if not, why not? If the man or boy who feels that he may have been put in some possible danger by a motor car, or who dislikes them for any reason, is at liberty to use all missiles, from tin cans to bullets, why should not the victim of the ping pong craze have equal rights in the line of so-called self-defense?

The solution of the question of the motor car in the streets must be looked for through methods diametrically opposite to those of the yellow journals; through temperate, deliberate and harmonious action on the part of all concerned. The foot passenger, who is opposed to the motor car partly because he cannot afford to own one, becomes a party to dangerous speeding when he pays his nickel for a ride in a trolley car; the driver and horseman, with a long record against him of fatal injuries from fractious horses and careless driving, cannot come into court with clean hands. As opposed to the attitude of so many papers in provoking ill feeling of all kinds, it is gratifying to note the action of a representative portion of the general public of New York in uniting with the motorists in the organization of an association for the benefit of all who use the roads. The motorists, in common with the pleasure drivers, the merchants, the cyclists and the expressmen and truckmen, have many interests in common, and a united effort for these must certainly result in a better mutual understanding on those points on which, through the diversity of certain interests, they would naturally tend to differ. The past ten years, with the introduction of the electric street car and the motor vehicle, and the popular demand for higher

speeds, together with a greatly increased volume of traffic in many localities, have brought up many new problems, which can only be settled by means of the most advanced ideas, and not by shotgun legislation and lynch law.

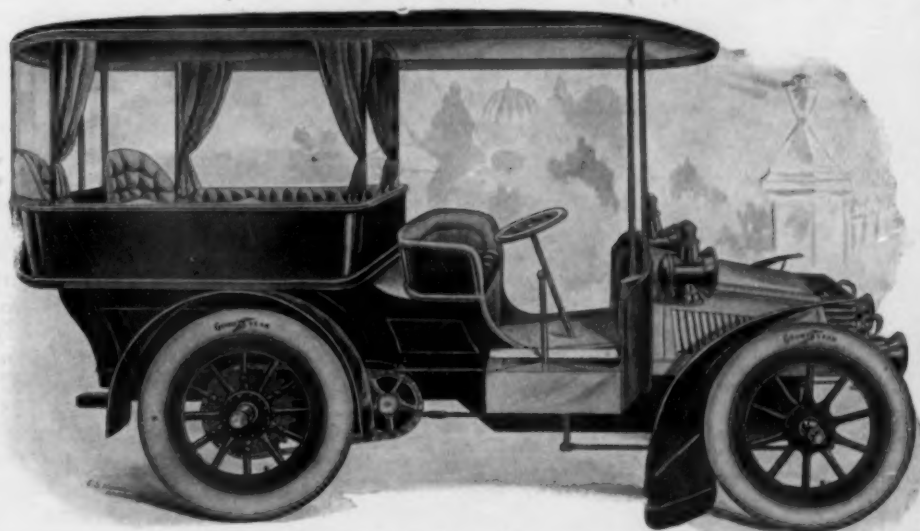
#### STORAGE BATTERY FABLES

The exploitation as an accomplished fact of the long-talked-of Edison battery is likely to do some harm and no possible good. The stories set afloat by certain New York papers, apparently with no excuse in the line of fact, and which have since been disavowed and denied by Mr. Edison, have been circulated in all parts of this country and are now coming to us in our foreign exchanges. It would not be safe to predict the limitations of Mr. Edison's inventive powers, but from a practical point of view he has thus far achieved no marketable results; nor is he personally making any definite promises.

That great improvement will be made in storage batteries before many years have

neau, the frame has been lengthened and the wheel base increased from 80 to 108 inches. The tonneau is wholly closed in, for winter use, by curved glass panels, and side curtains are also provided. The car is finished in crimson lake, lined with red, upholstered in blue morocco leather. Five-inch Goodyear detachable tires are fitted.

The standard vehicles of this power have 36-in. artillery wheels with steel axle boxes, and the front and rear springs are 31 and 36 inches long respectively. The motor is rated to develop 22 h.p. at 720 r.p.m. One lever is used for the four forward speeds, and a pedal operates the reverse. According to the *Automotor Journal* from which these particulars are taken, the 12 h.p. car has many new and excellent features this year, which presumably are duplicated on the larger car. Among them are the complete inclosure of the cam shaft and valve motion, the casting of the cylinders and heads together, thus avoiding a water joint, and the use of throttle instead of hit and



KING EDWARD'S 22 H.P. DAIMLER TONNEAU

passed can hardly be doubted, but when they will come, and whether by one great discovery on the part of one man like Edison or through gradual improvements made by the numerous manufacturers, no man can say. In the meanwhile we have the storage battery in a fair state of efficiency, at a cost and weight which make it practicable for many uses, and much more is to be gained by a realization of this fact than by waiting for something as indefinite and uncertain as the ideal electric storage battery of nominal cost and weight and unlimited endurance.

#### KING EDWARD'S NEW CAR

An attractive feature of the late automobile show conducted by the A. C. of Great Britain and Ireland was the nearly finished car built by the Daimler Motor Co., Ltd., to the order of His Majesty King Edward VII. This car is of the company's standard 22 h.p. 1902 model, except that, to accommodate the six passengers in the ton-

miss governing. Both electric and tube ignition are provided, and the commutator is carried on the dashboard, so as to be accessible to the driver. The pump, water tank and radiator are carried in the fore part of the frame. By the use of a special suspension for the transmission gear, the long under-frame has been eliminated, but the engine is still suspended in a short frame below the main frame, which latter is built up of wood sheathed with steel. Among minor details, readers will notice the curved ends of the dash.

Serpellet's "Easter Egg," with which the French exponent of steam motive power for road vehicles created the world's kilometer record of 29.45 sec., is reported to have been offered for sale in this country for \$10,000, or the best offer. The last previous report was to the effect that this machine had been bought in England for \$18,000, a premium of \$7,000 above the price for which it left the hands of the maker.



### CHICAGO CLUB NEWS

House Warming at the Michigan Ave. Home of the Chicago Automobile Club a Brilliant Affair—New York-Chicago Run

CHICAGO, June 16.—(Bureau Correspondence.)—Last Saturday evening, after many postponements, the Chicago Automobile Club members attended the opening of their new club house, at 243 Michigan Ave. Probably 350 automobilists of both sexes enjoyed the hospitality of the new club.

The house was profusely decorated with palms and ferns, while American beauty roses were everywhere in evidence. There were other American beauties present, also, and they added much to the life and brilliance of the evening.

Many of the visitors arrived at the club house in their automobiles, and probably as many as 150 carriages stopped at the house during the evening.

No regular entertainment was provided, the evening being given over to a purely informal opening. An orchestra provided music, and the club's chef served a most elaborate buffet luncheon. The entertainment was in charge of the house committee, of which Frank X. Mudd is chairman.

E. C. Gott, a new member of the club, has been made the assistant secretary, and will be in charge at the clubhouse.

#### Special Meeting for 1,000-Mile Run

The regular monthly meeting of the club was held last Thursday evening, when a resolution was adopted as follows: "Resolved, That Chicago Automobile Club tender to the municipal and park authorities its moral and material support and assistance in enforcing the regulations and limitations governing the use of motor vehicles in the streets, boulevards and parkways of the city of Chicago."

This resolution is really the club's official indorsement of the regulations for governing automobiles recently put in force by the city.

One other thing came up for discussion at the meeting, and that was the idea of trying to induce the New York club to make its endurance contest run of this fall one of a thousand miles, instead of 500, as was the case last year, and to make Chicago the objective point. The plan was enthusiastically received, and a special meeting is to be held this week to further discuss the work necessary to its accomplishment.

### CLUB RUN TO NEWPORT

PROVIDENCE, R. I., June 16. (Special Correspondence.)—A large number of the members of the Rhode Island Automobile

Club took part in the first club run of the season to Newport last Saturday afternoon. About fifteen carriages left the clubhouse when the pacemaker, Dr. Julian A. Chase, president of the club, gave the word. There was some lively traveling outside of the towns, and Fall River was reached in excellent time, a stop being made there for supplies. The run was then continued to Newport, and on arrival the members were greeted by Earl P. Mason, one of the club members. The carriages were stored there for Saturday night, and the party took quarters in the Aquidnick. Sunday morning the members enjoyed a run over the popular drives, including a visit to Fort Adams, and in the afternoon took lunch with Mr. Mason. The start for Providence was made Sunday evening, and the return trip was made in good time.

### FAVORS STATE ASSOCIATION

The Automobile Club of Syracuse Authorizes Secretary Elliott to Confer with Other New York Clubs—Will Not Join A. C. A.

SYRACUSE, N. Y., June 16. (Special Correspondence.)—The Automobile Club of Syracuse held its first meeting on Monday evening and elected the following new members: H. W. Chapin, C. A. Lockard, W. H. Larabee, W. E. Hookway, and Dr. C. J. Walsh. The principal business to come before the meeting was a letter from the American Automobile Association asking the Syracuse club to join it. It was decided to write to the association stating that the club was not in a position to join at present, and it is not likely that it will join in the future.

The Syracuse club is in favor of the plan of F. H. Elliott to form a New York State Association of Automobile Clubs. A resolution was adopted giving Mr. Elliott, the secretary, authority to confer with other clubs in the State and to get their ideas regarding such an association. He will confer with clubs in Buffalo, Rochester, Utica, Albany and Binghamton, and as soon as he has done that he will call a meeting of representatives of the clubs in this city and decide upon the course to be pursued. Mr. Elliott thinks that plan will go through. A consolidation of State clubs, he thinks, would be of great benefit to automobilists. There will be nothing in the consolidation that will prevent clubs from belonging to the American Automobile Association at the same time. The Syracuse club, however, holds that the dues of the larger organization are too high, and that the State association would be of more direct benefit.

It is probable that the Automobile Club of America will be asked to join as a New York club. The report of the treasurer of the Syracuse club showed the finances to be in a flourishing condition.

### THE CLEVELAND CLUB ACTS

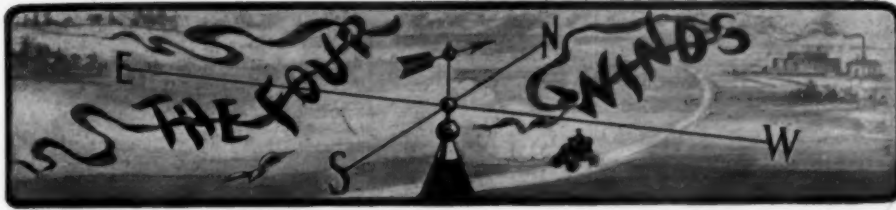
Second Week in September Selected for a Race (on Glenville Track—Will Join the A. A. C.—To Uphold New Ordinance

CLEVELAND, Ohio, June 16.—(Special Correspondence.)—The executive committee of the Cleveland Automobile Club met to-day. The committee is composed of E. L. Strong, Windsor T. White, Walter Root, George L. Weise and C. B. Shanks. This committee has also been chosen to act as a judicial and legislative committee for the club. An auditing committee, composed of E. L. Strong, C. B. Shanks and George Collister, was appointed; also a membership committee composed of Wm. C. Shires, B. F. Day, James G. More, Wm. M. Wright and O. S. Southworth. The committee on runs and tours, composed of Charles B. Shanks, George Collister and Windsor T. White, reported that a race meet would be held at Glenville track the second week in September. It was decided to apply for membership in the American Automobile Association.

The club will use every effort to see that members and owners of vehicles live up to the regulations of the automobile ordinance recently passed and which went into effect to-day. Letters will be written to members asking them to consider themselves as on a committee to see that the ordinance is rigorously observed. It was decided that for the present nothing should be done toward securing the passage of a universal lamp ordinance for all vehicles, as it is not thought desirable to incur the ill will of horse owners at this status of the automobile trade and sport.

### NEW CLUB IN PHILADELPHIA

At a meeting held in Philadelphia on June 10 for the purpose of organizing a new automobile club, a committee consisting of J. S. Bunting, A. S. Winslow, A. E. Maltby, W. D. Gash and G. Jason Walter Waters was appointed to draft a constitution and by-laws, to be submitted at a more general meeting to be held on the 16th. Members of the committee stated that they contemplated an active club with its own headquarters and the important object of enforcing regulations to secure the proper privileges of automobilists and to protect the rights of other people. They expect to go to the Legislature next January for legislation that will give them proper speed and will be prepared to demonstrate that what they ask is entirely consistent with the protection of all other users of the highways. The club will be open to all automobilists and will be affiliated with the American Automobile Association.



### NATIONAL HIGHWAY ORGANIZATION

The New York and Chicago Road Association was organized at a meeting held last Monday night at the rooms of the Bar Association in New York City. The purpose of this organization is to agitate the construction of a broad, macadamized highway from the metropolis on the Atlantic seaboard to the metropolis on the shore of Lake Michigan. Preliminary work of organization has been progressing for the past two months, both in the East and West, prominent persons in the good roads movement and in automobile and bicycle circles being canvassed as to their willingness to become officers. The election on Monday night resulted as follows:

President, Col. Albert A. Pope, Boston; first vice-president, John B. Uhle, president of the Highway Alliance, New York City; second vice-president, L. C. Boardman, New York City; treasurer, W. L. Dickinson, of Springfield, Mass.; secretary, A. H. Beatty, of New York City. The executive committee, in addition to the foregoing officers, is composed of Lieut.-Gov. Timothy L. Woodruff, New York; Winthrop E. Scarritt, president of the American Automobile Association, New York; F. C. Donald, president of the Chicago Automobile Club, Chicago; Burley B. Ayres, Chicago; Thomas J. Keenan, ex-president of the League of American Wheelmen, Pittsburg; W. S. Crandall, secretary of the Road Makers' Association, Minnesota; W. A. Howell, president of the League of American Wheelmen, Rockville, Conn.; Milo M. Belding, vice-president of the L. A. W., New York, and H. L. Perkins, Providence, R. I.

The plan of the association is to form local or organizations to build connecting links of good roads between the stretches of hard road that already exist along a route that has been chosen tentatively, but which is subject to slight change according to the willingness of counties or townships to undertake the cost of building sections of the highway through their limits in order to be directly on the national highway. The route as selected starts at Fort Lee, New Jersey, opposite 130th St., New York City, and follows the Hudson River on the west shore as far as Newburgh, then to Binghamton, Elmira, Corning, Olean and Jamestown, in New York State, thence to Conneaut, Ohio, and along the shore of Lake Erie, passing through Cleveland, Sandusky and Toledo, across northern Indiana, through Goshen and South Bend, and thence to Chicago.

This route is 850 miles in length, as compared with 987 miles by way of Albany and Buffalo, and 400 miles of the way is already improved with hard roads.

The new association has called a convention to be held in Atlantic City on July 18.

### ROAD USERS UNITE

A permanent organization of all classes of persons who use the public highways for vehicular traffic was perfected on June 11 in New York City under the name of the Associated Road Users of America. The objects of the organization, as outlined in the constitution, are the improvement of the streets of cities and the highways or special roads throughout the United States; the regulation of traffic and enforcement of laws governing the same; the erection of proper street signs and guide posts; the proper lighting of streets and highways and the keeping of them in good repair; to prevent the throwing of dangerous substances upon the streets or highways or flooding same with water; to mutually aid in the strict enforcement of all speed ordinances; to aid in securing proper transit and traffic facilities; to promote all legislation conducive to the interest of its members, and to oppose the same when it shall be deemed prejudicial.

The delegates present decided to offer the presidency to Dave H. Morris, of the Automobile Club of America, as representing both the motor vehicle and horse interests, and no further action will be taken with regard to this office until he officially accepts or declines the position. The officers elected were as follows: Vice-president, Dr. H. D. Gill, of the Road Drivers' Association; secretary-treasurer, Dr. E. V. Brendon, of the Associated Cycling Clubs; streets and highways committee, Thomas F. McCarty, of the Truck Owners' Association of New York, chairman; ways and means committee, Harry Unwin, of the National Association of Automobile Manufacturers, chairman.

### EXONERATED BY THE GRAND JURY

The investigation into the fatal accident at the Staten Island speed trials on May 31, which was begun by the Grand Jury of Richmond County on June 11, was con-

cluded last Thursday. The jury failed to find any person or persons criminally responsible for the deaths of Andrew Featherstone and John G. Bogart, who were killed by the Baker electric racing machine, but it recommended that "no further racing or speed tests of automobiles be held on the public highways in Richmond County." The charge of manslaughter preferred against W. C. Baker and C. E. Denzer, who operated the machine, was dismissed by agreement between their counsel and the District-Attorney of Richmond County; and it is understood that there will be no further criminal proceedings in the case. The defendants were not required to appear before Magistrate Marsh on Friday morning for examination, and their bail bond was discharged.

### RACE MEET POSTPONED

The race meet announced to be held at Brighton Beach on June 21, under the auspices of "The National Automobile Racing Association," has been postponed, owing to the attitude of the American Automobile Association and the Automobile Club of America in refusing to sanction the event and threatening to disqualify competitors in the races from future competition in sanctioned meets. The promoters, in withdrawing, announce that the meet is merely postponed, pending the formation of an association that shall be able to secure a license from the A. A. A. and that the events will be run at Brighton Beach on August 23, which is the same date announced for the meet of the Long Island Automobile Club at the same track.

### THE A. C. A. RECORD AWARDS

The official awards of prizes for the kilometer and mile record trials on Staten Island on May 31 have been announced as in the accompanying table. Gold medals were given for the best time made in each class, silver medals for the second best time and bronze medals for the third best time. Although C. H. Metz broke the record in the motor bicycle class he was given only a silver medal, presumably because there was no other competitor in this class. W. C. Baker received no award, because the Baker machine failed to finish the mile, and no medals were given for kilometer times, the trials having been for the mile, and the times for the kilometer having been taken merely for the sake of comparison with foreign records.

### OFFICIAL AWARDS FOR THE STATEN ISLAND SPEED TRIALS.

CLASS I.—(Motor Bicycles.)		Description.		Kilometer.	Mile.		
No.	Entered by.						
2	C. H. Metz.....	3 1/4 h.p. Orient.....	.43%	1.10%		Silver medal	
CLASS III.—(Gasoline, under 1000 lbs.)							
5	L. S. Thompson.....	5 h.p. Renault.....	.59	1.35%		Gold medal	
9	Lewis Nixon.....	7 h.p. Long Distance.....	1.03	1.43%		Silver medal	
6	H. Ward Leonard.....	8 h.p. Knickerbocker.....	1.05%	1.45		Bronze medal	
CLASS IV.—(Gasoline, 1,000 to 2,000 lbs.)							
15	Percy Owen.....	15 h.p. Winton.....	.47	1.17%		Gold medal	
11	Ernest Cuenod.....	16 h.p. Rochet-Schneider.....	.56%	1.22%		Silver medal	
12	Jefferson Selligman.....	12 h.p. Mors.....	.87%	1.32%		Bronze medal	
CLASS V.—(Gasoline, over 2,000 lbs.)							
20	E. E. Britton & A. J. Levy.....	60 h.p. Mors.....	.34%	.55%		Gold medal	
23	Wm. Guggenheim.....	24 h.p. Panhard.....	.44	1.11		Silver medal	
25	E. E. Britton.....	16 h.p. Panhard.....	.59%	1.36%		Bronze medal	
CLASS VI.—(Steam.)							
22	S. T. Davis, Jr.....	10 h.p. Locomobile.....	.46%	1.12		Gold medal	
36	H. H. Wells.....	4% h.p. Prescott....	1.01%	1.37%		Silver medal	



### TIRE COMPANIES AROUSED

A Triangular Legal Fight May Result from Circuit Court Decision Holding Grant Patent Void  
—Will be Carried to Supreme Court

A considerable stir in solid tire circles has been precipitated by the recent decision of the United States Court of Appeals that the Grant patent, covering the construction of the two-wire solid rubber carriage tire, is null and void for lack of originality or novelty of invention. This opinion in favor of the Goodyear Tire & Rubber Co. as appelle in the infringement suit brought against it by the Consolidated Rubber Tire Co., as owner of the Grant patent, was a surprise to the trade as a whole, and had an immediate effect on those concerns most directly concerned. Coming after three adverse decisions in the lower courts, the Goodyear company naturally made the most of its victory by announcing that, unaided by other tire manufacturers, it had brought to an end "the days of monopoly in the tire trade," and would continue to make and sell tires under its Wing patent, whose validity was sustained.

The B. F. Goodrich Co., which first manufactured solid tires under the Grant patent exclusively for the Rubber Tire Wheel Co., and later for the Consolidated Rubber Tire Co., its successor, announces its intention of continuing the production of these tires, which it will sell direct under the name of the Goodrich solid tire instead of indirectly through the Consolidated Rubber Tire Co.

But the Consolidated Rubber Co. has determined to carry the case to the Supreme Court of the United States for review, the company's attorneys having carefully considered the opinion of the Circuit Court of Appeals and concluded that the reasoning of the court was wrong and that the decision cannot stand. And in the meantime the company announces that it will continue, through the courts, to protect the Grant patent and the rights of its licensees under it.

### LOCOMOBILE CO. MUST ANSWER

BRIDGEPORT, CONN., June 16. (Special Correspondence.)—An action brought by the American Bridge Co. against the Locomobile Co. of America came up before Judge William T. Elmer in the civil superior court here last Friday, on the plaintiff's motion for judgment for want of answer. The bridge trust sues the defendant for alleged failure to place an order with it after contract had been made to furnish material for the company's factory in Bridgeport, the contract having been awarded to a Bos-

ton firm instead. Big damages are asked for.

Attorney Frank B. Williams, of New York, appeared before the court for the defendant, and stated that they did not expect that anything was to be done in this case, as a similar action was now pending in the New York courts and had been partially tried. He explained that the defendant thought the action was instituted in Bridgeport solely to hold the real estate and had no idea that it would be pressed, especially while the other case was on trial.

Judge Elmer said the defendant would have to make answer of some kind. He then ordered them to file an answer or other pleading within two weeks.

### MILWAUKEE COMPANY AFFAIRS

The Schedule Shows Assets Larger than Liabilities  
—Prospects of Big New Company Less  
Bright—New Winton Agency

MILWAUKEE, Wis., June 16.—(Special Correspondence.)—The schedule of the bankrupt Milwaukee Automobile Co. was filed in the office of the clerk of the United States District Court last Saturday. The liabilities, according to the schedule, are placed at \$44,612.71. They include wages, \$19,542.05; secured claims, \$22,503.76; unsecured claims, and \$2,000 in notes and bills. The assets, placed at \$41,993.48, include \$31,700 in automobiles, \$4,000 stock, \$4,000 in machinery and tools, and \$2,293.48 bills receivable. The total assets considerably exceed the liabilities, according to the schedule.

There are 197 unsecured creditors, of which 94 are Milwaukee concerns.

Relative to the gossip that eastern people would invest money and manufacture automobiles in the plant occupied formerly by the defunct concern, President Starkweather admitted to the representative of the AUTOMOBILE AND MOTOR REVIEW that negotiations with Cleveland and St. Louis capitalists were pending, but that prospects at the present time are not so encouraging as a few weeks ago. One of the proposed investors has already decided to withdraw from the intended project, and it does not seem probable that the other investors will carry out the promises made by him.

Mr. Starkweather said, however, that there is still hope for a factory here, and that it is most probable the plant will be occupied by the new concern. He would not give further details.

"There is considerable material in our plant," said Mr. Starkweather, "and it will all be made into machines by the employees under the supervision of the receivers."

The Winton agency, which up to this time has been in charge of George Odenbrett, has been turned over to the Jonas Cycle Co., which is also local agent for the Haynes-Apperson and the Oldsmobile. Theodore Jonas, president of the company, expects to receive a Winton touring car this week. "The Haynes-Apperson has found favor in Milwaukee," said Mr. Jonas, "and although I secured the agency only two months ago, I have sold five machines. This does not include two more that I have ordered from the factory, and which will be delivered to the respective customers in July."

### CLEVELAND NEWS BUDGET

Buckmobiles in the West—Winton Racing Machine Much Talked About—Stearns Company Bringing Out a New Model

CLEVELAND, June 16 (Special Correspondence.)—Charles B. Shanks, advertising manager for the Winton Motor Carriage Co., will be at the head of a company formed here for the purpose of handling the product of the Buckmobile Co., of Utica, N. Y., from Ohio to the Pacific Coast. Mr. Shanks' venture will have no effect upon his connection with the Winton company, with whom he is regarded as a fixture. A Cleveland depot will be established in the near future. The vehicle will be handled largely by Winton agents in the West, who are experiencing a strong demand for a light vehicle.

### Interest in the Winton Racer

The interest of all racing enthusiasts is centered on the new racing machine which the Winton company will shortly bring out. It is understood that the vehicle will be 14 ft. over all and that it will weigh about 2,000 lbs. They say it will be rated as 40-h.p., but according to vague hints thrown out by representatives of the company, it will have nearer the efficiency of a good-sized locomotive.

### A New Stearns Model

The F. B. Stearns Co. will soon be out with another new model, an \$1,800 touring car. It will have the same mechanism as the single cylinder phaeton which the concern has been building for some time, but will be fitted with a handsomely finished French type body equipped with tonneau.

Harry S. Moore has taken the agency for the Elmore, a sample of which has been received recently. Mr. Moore has already succeeded in disposing of three of the machines. The vehicle is a neat runabout fitted with two-cylinder, two-cycle motor of original design. Thus far the machine is giving excellent satisfaction.

The George Worthington Co. is working up a considerable jobbing business in automobile tires and supplies, especially in the small towns. The company is not confining itself to any particular lines, but furnishes anything for which it can secure an order. Because of the great variety of sizes required the company is making no attempt to carry a stock of automobile tires.

## CHICAGO TRADE ITEMS

CHICAGO, Ill., June 16 (Bureau Correspondence.)—Ralph Temple has rented from the Chicago Automobile Club the large two story and basement barn located on the rear of its grounds, and will equip it for a repair station. Mr. Temple states that the first floor will be filled with all the necessary machinery to handle all sorts of repairs for all makes of machines. An elevator will be put in, and first-class mechanics employed who will give instant attention to the wants of all who may be in trouble. The barn will also be used largely by Mr. Temple's patrons, as he will conduct a sort of automobile boarding stable. Those club members who wish such a service will also be accommodated.

The Ralph Temple Co. has been reorganized as the Ralph Temple and Austrian Co. and has secured the agency in Chicago for the Panhard, Renault and Peugeot cars for which Smith & Mabley are American selling agents.

Frank Illsley's establishment on Wabash Ave. was quite seriously damaged by fire on Saturday evening, caused, as usual, by carelessness in the handling of gasoline. A customer ran his carriage into the store for a fresh supply of gasoline and attempted to fill the tank while the lamps were lighted, with the result of the light vapor catching fire and exploding. The room was badly scorched and the machine somewhat damaged.

## STEAMOBILE BRANCH CLOSED

WASHINGTON, D. C., June 14. (Special Correspondence.)—The past week marked the closing of the Steamobile branch on Fourteenth St. and the placing of the agency for this vehicle with the Automobile Storage & Repair Co., in Stanton Court. The selection of the Automobile Storage & Repair Co. as the local representative of the Steamobile Company of America is an admirable one. The local concern is becoming a very important factor in the automobile trade of the National Capital, having excellent facilities for the sale and storage of carriages. Besides the Steamobile, it has the agency for the Baker electric, the Crestmobile and the De Dion-Bouton motorettes, and does an extensive business in automobile supplies of all kinds. In fact, its business has increased to such proportions that the present quarters in Stanton Court are inadequate, and it is expected that new and larger quarters will be secured early in the fall.

## NEW FRANKLIN VEHICLE TESTED

SYRACUSE, N. Y., June 16. (Special Correspondence.)—W. C. Lipe, vice-president of the H. H. Franklin Mfg. Co., gave one of the company's new automobiles an endurance test a few days ago. He was accompanied by W. H. Brown, of the company. They drove the machine to Lisle, N. Y., 57 miles distant, and returned the same day.

## STEEL RIMS

CRESCENT  
AND DROP CENTERFOR WIRE  
OR WOOD WHEELSANY DIAMETER  
UP TO 4 IN. CROSS SECTIONDRILLED OR UNDRILLED  
AS REQUIREDAUTOMOBILE AND CYCLE PARTS CO.  
SMITH STAMPINGS FACTORY  
Milwaukee Wisconsin

Side trips were taken at Lisle amounting to 20 miles, so that the total distance gone was about 134 miles. The start was made from this city at 4:30 a. m., stopping in Cortland one hour, Marathon 30 minutes and Lisle 3¼ hours. Returning they left Lisle at 2 p. m. and reached Syracuse at 7:30 p. m. The passenger weight was 407 lbs. No effort was made to break speed records, the purpose being to demonstrate the running qualities of the machine, which is the regular type made by the company and has the Wilkinson 4-cylinder, air-cooled motor. The afternoon was very hot, but the motor took the hills without difficulty, although some of them are as long and steep as any in the State.

## DEMONSTRATING KEROSENE BURNERS

The Equitable Auto-Truck Power Burner Company, of West Lynn, Mass., has for more than a year been using kerosene for fuel, but before putting its products on the market has been waiting for a patent. The use of kerosene has been estimated by the concern to reduce the cost of running two-thirds.

The company has its own automobiles, heavy and powerful machines, in use and employing kerosene for fuel. It has called the attention of other companies to its burners and on July 11 started an old Locomobile, fitted with kerosene burners, on an experimental trip from Boston, especially to demonstrate that it could be run successfully with kerosene.

Captain W. E. Pearson, treasurer of the company, and George L. Badger, assistant superintendent, who started on the trip, expected to take three or four days for it, as runs of fifty miles per day, or even less,

were to be made, the rest of the time being devoted to experiments with a view to obtaining facts concerning the amounts of water and kerosene used, the speed that could be maintained, etc. The primary object of the trip was to find out how much cheaper the run could be made with kerosene than with gasoline and to demonstrate the practicability of the company's burners.

## GRANT AXLE BUSINESS BOUGHT

The Standard Roller Bearing Co., of Philadelphia, Pa., has purchased the entire business, patents and good will of the Grant Roller Bearing Axle and Wheel Co., of Springfield, O., and is prepared to fill all orders for roller bearing axles as made by that concern. These axles have been extensively used by builders and users of carriages, wagons and automobiles, and added to the ball, roller and anti-friction bearings already made by the Standard Roller Bearing Co., they will make the line of the Standard Co. extensive and complete.

The Pegasus Automobile Co., Harvey, Ill., was recently incorporated with a capital stock of \$10,000. J. H. Devoe, N. C. Flint and C. J. Chapman are the incorporators.

The Larrabee Automobile & Mfg. Co. was recently incorporated at Stockton, Cal. The capital stock is \$300,000.

The Robert Thomson Co., Rochester, N. Y., was recently organized to deal in automobiles and sporting goods.

The Washington Automobile Co. has been organized at Washington, Pa. The capital stock is \$100,000.

### THE HERCULES RUNNING GEAR

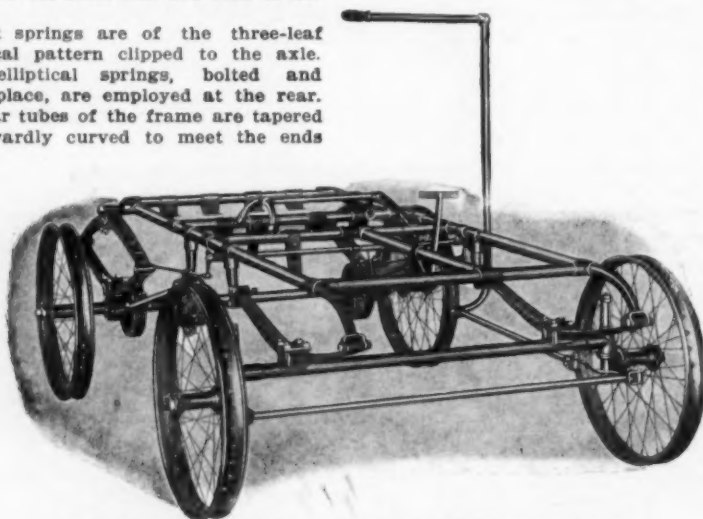
Large numbers of tubular running gears for electric and gasoline vehicles are being produced for the market by the Smith Stamping Factory, of the Automobile & Cycle Parts Co. in Milwaukee. These gears are designated the Hercules, having been designed and constructed by the best engineering skill which the A. & C. P. Co. has been able to command for a year past. They have been severely tested and it is held that there is not a weak spot in them. The gear here illustrated is for electric vehicles; that for gasoline machines shows only slight modifications from it.

The main frame is built of 1½-in. steel tubing, the side bars being 10 gauge stock with reinforcing pieces extended forwardly for 5 ft. The extreme length, from center of spring bolt to center of the rear frame tube is 7 ft., and the width, measured from center to center of the side bars, is 32¼ ins. This will readily accommodate a 30-in. body, but by fitting close to the steering post a 36-in. body can be used.

The truss for the motor is so constructed that if the motor should be swung violently in a lateral direction it would not be displaced. The truss is thoroughly braced and adjusting bolts fastened to two brackets attached to the cross bar of the frame permit the motor to swing longitudinally.

Eight battery board supporting brackets are brazed to the cross and end bars of the frame.

The front springs are of the three-leaf semi-elliptical pattern clipped to the axle. Four-leaf elliptical springs, bolted and clipped in place, are employed at the rear. The side bar tubes of the frame are tapered and downwardly curved to meet the ends



HERCULES RUNNING GEAR FOR ELECTRIC VEHICLES

of the front springs, and similarly tapered arms are brazed to the side bars and extend downwardly and forwardly to meet the rear ends of the front springs. Other downwardly extending and outwardly curved arms are provided for the reception of the steps.

The side steering rod is tubular and is reinforced at its upper end to give strength where the knuckle is keyed on. The lower end of the lever is curved inwardly to form a crank and carries at its extremity a steel piece that connects with a bronze knuckle joint which actuates the connecting rod and, through it, the steering spindle, which is a one-piece forging.

The equalizing gear is of the straight spur gear type, the gears being of bronze. Brakes are of the band-drum pattern. The front axle is tubular, reinforced its entire length. The rear axle is solid steel, 1½ ins. in diameter.

Either wire or wood wheels are fitted. The former are 30 ins. diameter and take 3-in. tires. Front wheel bearings are fitted with ¾-in. balls, 12 in the outside bearing and 13 on the inside. The track width is 4 ft. 6 ins. from center to center of wheels, permitting

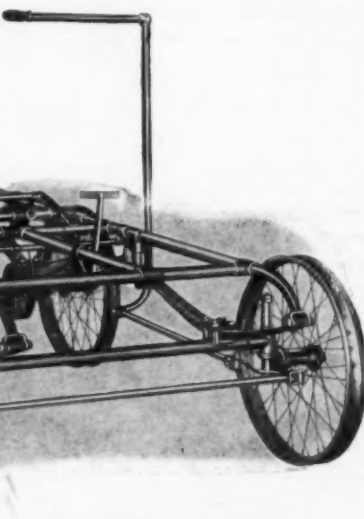
safe running in street railway tracks.

The wood wheels which may be equipped have spokes staggered in a wood hub fitted with bushings that are bored after they are set in the hubs, thus insuring true wheels.

These running gears are fitted with roller bearing chains ¾-in. by 1-in. pitch. Adjustment of the chain is effected by swinging the motor forward or backward and fastening it in position.

### KNOX COMPANY EXTENSIONS

The Knox Automobile Co., of Springfield, Mass., is planning to so increase its plant during this month that its limit of production will be raised from 8 to 12 complete automobiles a week. The company has recently purchased improved machinery to the value of \$10,000, and this will be installed as soon as the new building now in process of construction is ready for occupancy. It will be used as an assembling room, and the new machines will be put up in the old assembling room. The increased size of the plant will necessitate the employment of many additional machinists. The company has raised the selling price of its automobiles from \$1,000 to \$1,100. This increase went into effect on the first of June, and applies on all machines ordered since then. The plant is unable to supply the orders already booked as fast as is desirable, but, with the introduction of the new machinery about July 1,



the officers of the company expect to catch up with their orders.

The Bowen Mfg. Co., of Auburn, N. Y., is erecting a new building that is a duplicate of its present four-story 40x75-ft. plant. The new building will be ready for occupancy by August 15. Three carloads of automatic machinery for the manufacture of oil cups, grease cups, machine screw parts, felt washers, and air pump whistles, are now on the way, and after being installed with the other machinery will put the Bowen Company in position not only to take care of its rapidly growing business in these articles, but also to do all sorts of stamping, drawing, turning and casting in steel, iron and brass.

The Automotor Co. is working a night force in its Springfield, Mass., plant, in order to fill orders as fast as they come in. There is an increasing demand for the company's big touring cars. Considerable interest has been manifested in the new 12-h.p. vehicle that the company is putting out.

Spalding & Co., of Syracuse, N. Y., are selling the Pierce automobile, made by George N. Pierce & Co., of Buffalo.

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**EVERY GOOD POINT**  
of ALL SYSTEMS of Motive Power NOW BEATEN by the

❖ **WHITE** ❖

## STEAM CARRIAGES

At the Automobile Club of America Endurance Contest, run on May 30th, the **WHITE STEAM CARRIAGES** used only  $5\frac{3}{4}$  gallons of gasoline and 6 gallons of water, while another make of steam carriage, winning a first-class certificate, used  $114\frac{3}{4}$  gallons.

The 3 Whites were the only steam carriages entered in the non-stop class.

For economy, reliability and hard every day use you can't excel the **WHITE** by any expensive machine in the world. Send for catalogue of 1902 model.

**WHITE SEWING MACHINE COMPANY**, Rose Bldg., Cleveland, O.

BRANCHES: 22 Union Square, New York; 300 Post St., San Francisco, Cal.; 509 Tremont St., Boston Mass.; 609 Main St., Buffalo; 212 Woodward Ave., Detroit

The Curtis Machine Co. (incorporated under the laws of the State of New Jersey, with an authorized capital of \$10,000) recently acquired the entire interests of the Curtis Cycle Co., of Elizabeth, N. J., and will continue that business in all its branches, with additional facilities for the manufacture and sale of the Tyron steam motor for motor vehicles, and also the manufacture and sale of automobiles and the general repairing of the same, as well as a fully equipped storage and charging plant

Hartford, Conn., has put to use a new automobile police ambulance, made by the Electric Vehicle Co.

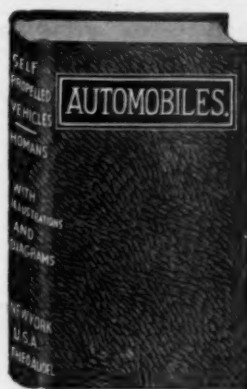
## Special Notices

Advertisements of second hand vehicles or parts for sale, or for Positions Wanted, inserted under this heading at 10c per line. Remittance must accompany copy.

**WANTED**—A Haynes-Apperson or an Autocar, 1902 model. Will pay a reasonable price for a machine in first-class condition. Address "Automobile," Box D, Jersey City, N. J.

**FOR SALE**—One Four-Passenger Haynes-Apperson Surrey, 1901 model. Used in New York City from May 25th to October 25th, 1901. Repainted and thoroughly repaired, with late improvements. At our factory. Immediate delivery. Price of 1902 Haynes-Apperson Surrey is \$1,800. First check for \$1,250 takes this one. Address, Apperson Bros. Automobile Co., Kokomo, Indiana. #28

**"AUTOCAR" RUNABOUT** (Gasoline)—For sale cheap. AUTO, 10 S. Wall St., Columbus, O. #21



## Do You Run An Auto?

Do You Want to Understand its Workings

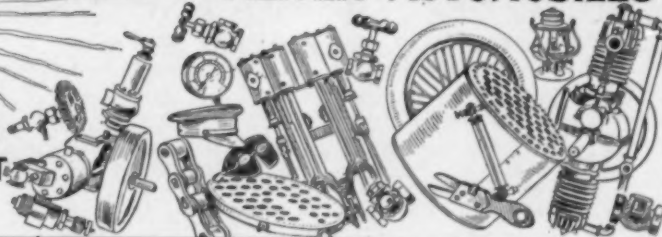
### "SELF-PROPELLED VEHICLES"

the new book by J. E. Homans, A.M., tells the whole story. It explains in simple, non-technical language the mechanism and management of every type of automobile. 640 pages; 500 illustrations; Complete diagrams; Ready reference index; a great trouble-saver. Write for booklet showing sample pages, free on request. :: :: :: :: ::

**THEO. AUDEL & CO., Publishers**  
63 Fifth Avenue, New York

## EVERYTHING UNDER THE SUN TO BUILD AND REPAIR AUTOMOBILES

**CHAS E. MILLER**  
97-101 READE ST.  
NEW YORK



**72-PAGE ILLUSTRATED CATALOGUE**  
MAILED ON REQUEST

## Tires Are Costly

SAVE THEM

BY USING

**"B. B."**

**Adjustable Jacks**

When your Auto is not in use.



It does not take a very wise man to see the damage done to tires when hundreds of pounds of weight is constantly on it.

Send for Description of Our Many Styles

**BRAY MFG. CO., 115 Broadway, N. Y.**  
Factory, Newark, N. J.

**GLEASON-PETERS.**  
PUMP and horn may be fastened underneath body of vehicle, and has sleeve which fits over plunger rod, thus allowing the foot board to be readily removed, without disconnecting any part of the apparatus. This foot horn overcomes the necessity of taking the hand off the steering gear to blow horn. The horns used are imported, and made especially for this purpose. Pump can be purchased separately, and readily attached to the horn by rubber tubing. The whole apparatus is very light, weighing but two pounds, and all parts are of bronze and rust proof. It is finished in black enamel (baked).

**Foot Horn**

PRICE \$12.00 COMPLETE.  
- \$5.00 PUMP ONLY.

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**GLEASON-PETERS AIR PUMP CO.,**  
183 Mercer St., NEW YORK.



## Save Your Nerves

BY APPLYING A

**Reliance Low Water Alarm**

TO YOUR STEAM VEHCLE

SEND FOR ILLUSTRATED CIRCULAR

**Reliance Gauge Column Co.**  
CLEVELAND, OHIO

## Ofeldt Regulators

Have No  
Packing  
Boxes to  
Leak

PRICE  
**\$5.50**



Patented  
1901

Weight  
2 Lbs.

Most accurate fuel regulating device ever invented. Will positively regulate within two pounds. Diaphragm acts directly on fuel valve. SIMPLE and SENSITIVE. We guarantee satisfaction.

**F. W. OFELDT & SONS**

Foot of 25th St.

BROOKLYN, N. Y.

.. THE ..

## Cleveland Wire Spring Co.

CLEVELAND, OHIO

Manufacturers of

**HIGH GRADE, OIL TEMPERED  
Spiral Steel Wire Springs**

OF ALL DESCRIPTIONS



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## Lathrop Marine Motors

Sizes, 2%, 3%, 4%, 5%, 6%, 7%, 8% and 9%  
Horse Power

**J. W. LATHROP**  
MYSTIC, CONN.



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Detroit, Mich.

This cut shows the tail-board down, creating room for two additional passengers. When closed up it makes an ideal one-seated vehicle.



**CINCINNATI PANEL CO.,**  
CINCINNATI, OHIO.

## RELIABLE OILING AND GREASE DEVICES.



**HALL MFG. CO., 40 Cortlandt St., New York, U. S. A.**

Lubrication our Specialty.

Adopted by REMINGTON  
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Filters, Oiler Set Stands,  
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Oiler Sets, Packing, Cylinder  
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Official Suppliers to all  
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who want Reliable  
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# The Most Expensive Automobile in the World

Can be ruined unless you use the proper lubricants for its working parts.  
Hundreds of owners will tell you that

## DIXON'S 635 GRAPHITE

is best for Engine Slides and Bearings

## DIXON'S GRAPHITOLEO

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## DIXON'S Graphite Compound

is best for Joints and Screw Threads

## DIXON

can solve your lubrication problems

One owner says: "I would as soon think of running my steam machine without water as without using your graphite." Send for testimonial letters and FREE sample.

By using Dixon's Automobile Graphites you **save their cost ten times over** in added life to your machine and added years to your life.

**JOS. DIXON CRUCIBLE CO., Jersey City, N.J.**



## Monogram Oils & Greases

Specially adapted for Automobile Lubrication  
Write for catalog and price list

Columbia Lubricants Co. 22 Burling Slip  
NEW YORK



Lubricators, Oilers, Grease Cups, &c.  
FOR GASOLINE ENGINES

WRITE US FOR PARTICULARS

The G. B. Essex Brass Co.  
DETROIT, MICH.



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World Building CLEVELAND, OHIO

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In the manufacture of Jump Spark Ignition Apparatus. Our catalog will convince you of this fact. Write for it.

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## WONDERFUL RESULTS ...WITH... MOSLER SPIT FIRE SPARK PLUG.



Protected Porcelain and Sparking Point.

**SIMPLE, RELIABLE,  
INDESTRUCTABLE.**

Special Nickel Rod with Screw adjustment for accurate setting between sparking points—avoids bending and breaking of platinum points.

Reversible Porcelain—Double Life

**\$2.50 Complete.**

Any Standard French or American Thread

Special Discounts quoted to  
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## Splitdorf Coils

That's all.  
They tell the  
rest.  
C.F. Splitdorf  
17  
Vanderwater St  
NEW YORK

## GOULD Storage Battery FOR AUTOMOBILES



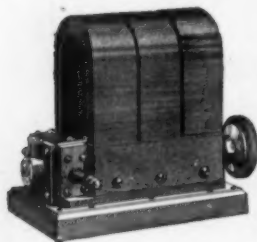
OVER  
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CELLS IN  
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GREATEST  
MILEAGE  
COMBINED  
WITH  
LONGEST  
LIFE

GOULD STORAGE BATTERY CO.  
25 West 33d Street, - - NEW YORK CITY

## THE NEW Henricks Igniter



IS SUPERIOR TO  
ALL OTHERS. .

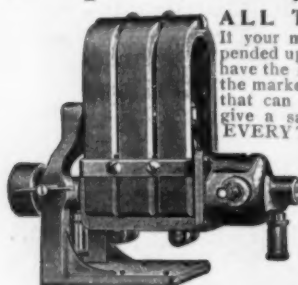
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to Marine and  
Automobile  
Engines

Successfully works  
Jump Spark  
Coil

BOOKLET FREE

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INDIANAPOLIS, IND.

## A Spark Every Time



ALL THE TIME  
If your motor is to be de-  
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have the Best Dynamo on  
the market. You want one  
that can be relied on to  
give a satisfactory spark  
EVERY TIME, don't you?  
Not "ordinarily"  
merely, but  
"ALL THE  
TIME."

Write for our  
booklet—It's in-  
teresting.

"A LOT DEPENDS ON THE DYNAMO"  
THE CARLISLE & FINCH CO.  
223 E. Clinton Ave., Cincinnati, O.

**DIETZ AUTOMOBILE LAMPS**

LEAD ALL OTHERS BECAUSE THEY ARE NO TROUBLE TO CARE FOR AND  
DO NOT BLOW NOR JAR OUT. SEND FOR BOOKLET

R. E. Dietz Company Established 1840 33 Laight St., New York

## ZECO GENERATORS

for sparking Gas and Gasoline  
Engines of all sizes and makes.

EXTRA QUALITY.

LOW PRICE.

Write for our Special Circular.

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gives a spark one and a half to two inches long, which  
will always cross the intervening gap. It will work several  
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MUELLER SPARK COIL AND YOUR IGNITION  
TROUBLES WILL CEASE.

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An Ignition Battery Specially  
Adapted to Either

AUTOMOBILES  
MOTOR CYCLES or  
MARINE ENGINES

Send for  
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H. C. MacRAE, Baltimore, Md.



The Cheapest RELIABLE Safety Water  
Column that has ever been brought out is th

## "AUTO-PET"

It is small, reliable, durable and positive.

Made by the

Jarvis Engine and Machine Works  
LANSING, MICH.

## H-U. 50<sup>m</sup> Accumulators

Non-Infringing

Light Weight

Long Mileage

Durability

HELIOS-UPTON CO. CHICAGO, ILL.



## "Quick Action"

Igniting Dy-  
namos Excel  
all others.

No spark coils;  
no batteries  
needed on Butt  
Spark Engines

It will operate  
with Jump Spark Coils. Send for Catalogue.

The Miller-Knoblock  
Electric Mfg. Co.

SOUTH BEND, INDIANA

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THE PITTSBURGH REDUCTION CO.

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Aluminum Automobile Parts a Specialty

**LIGHT AND MEDIUM WEIGHT  
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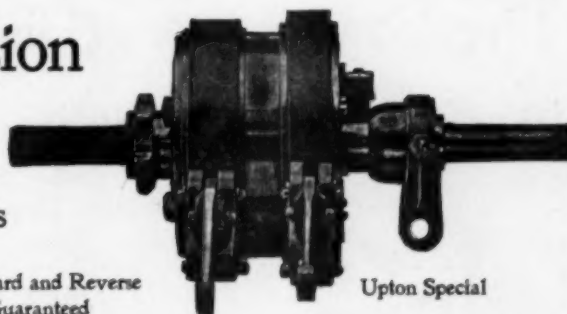
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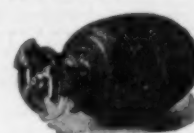


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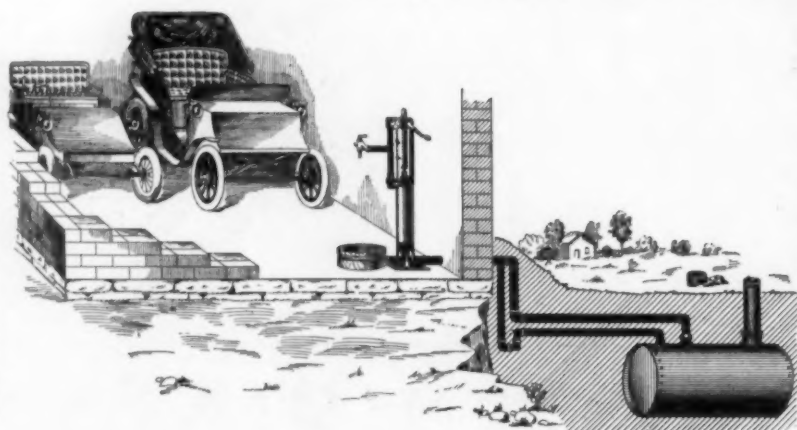
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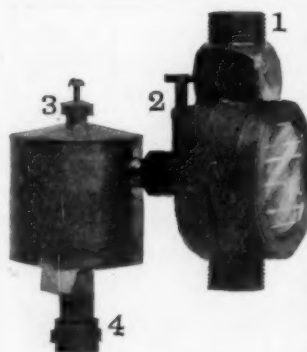
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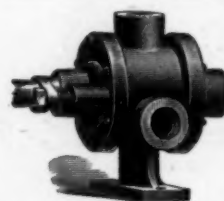
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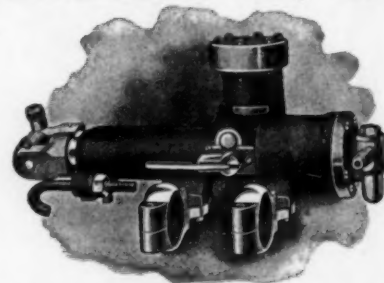
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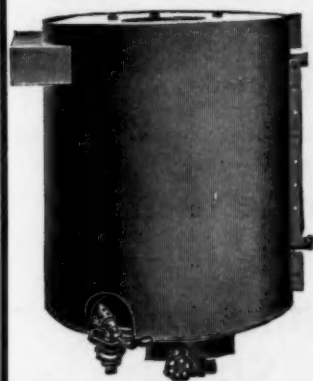
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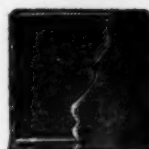
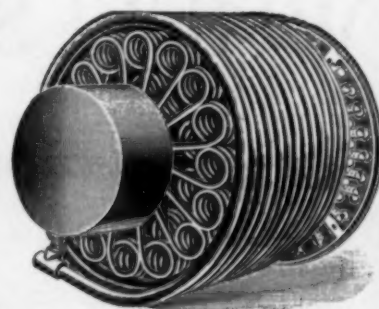
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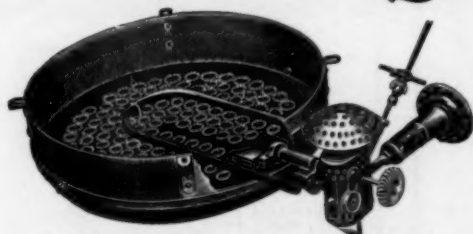
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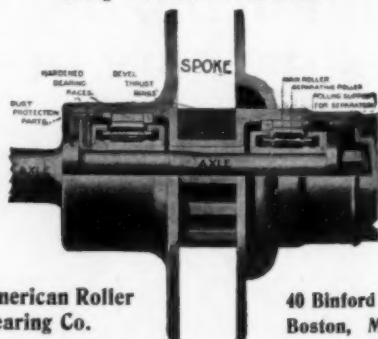
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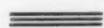
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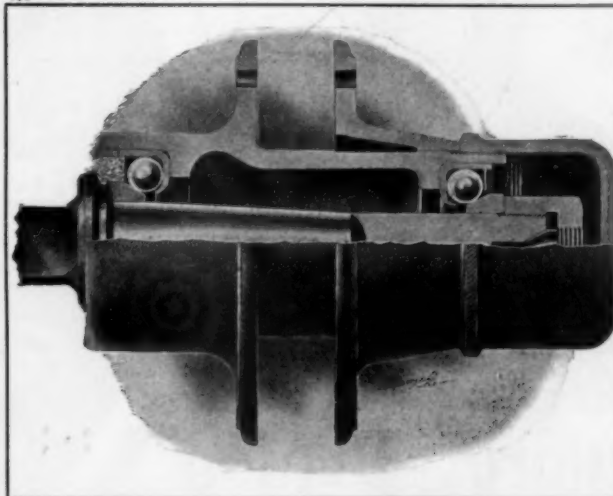


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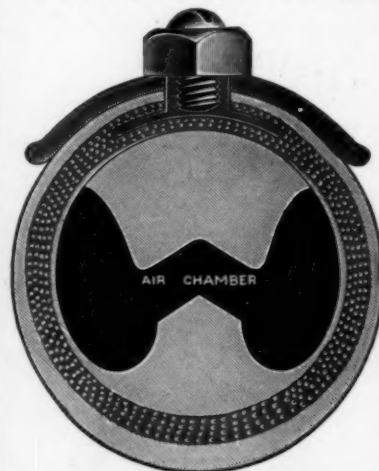
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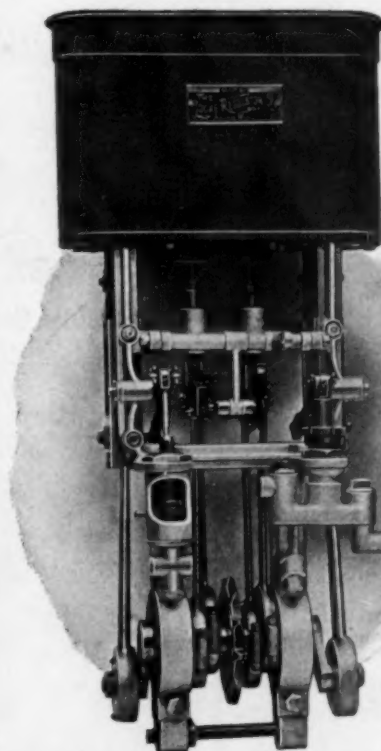
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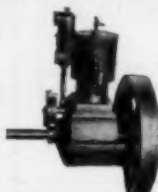
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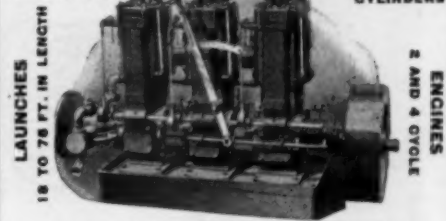
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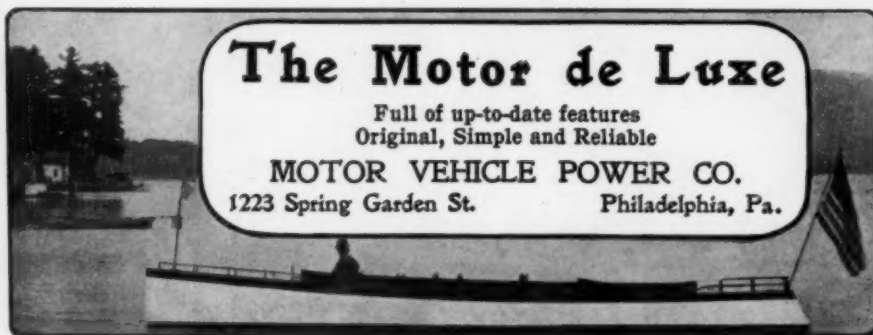
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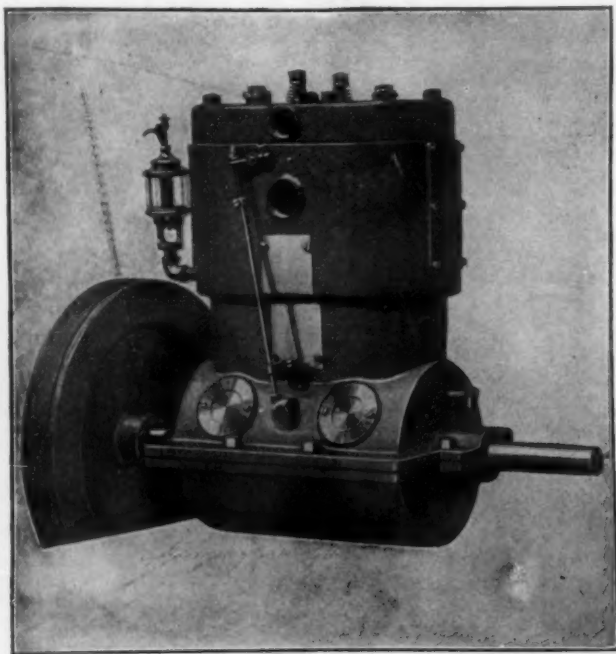
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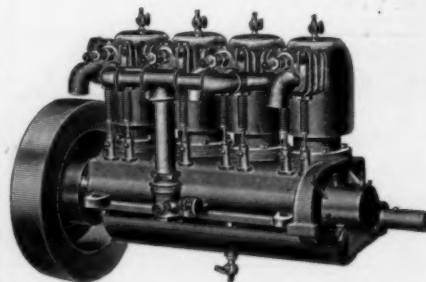
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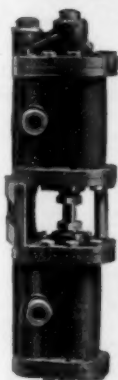
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 George Hannan, 1455 California St., Denver.  
 Manufacturers Co., 97 Fremont St., San Francisco.  
 Banker Bros. Co., East End, Pittsburg.  
 C. H. Johnson, 55 So. Forsyth St., Atlanta.  
 Day Automobile Co., St. Louis and Kansas City.  
 Rochester Auto Co., Rochester.  
 Autovehic Co., Newark.  
 F. W. Stockbridge, Paterson.  
 Brown, Thompson & Co., Hartford.  
 Hyslop Bros., Toronto.  
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See account Long Island Endurance Run, page 536 *Horseless Age*.

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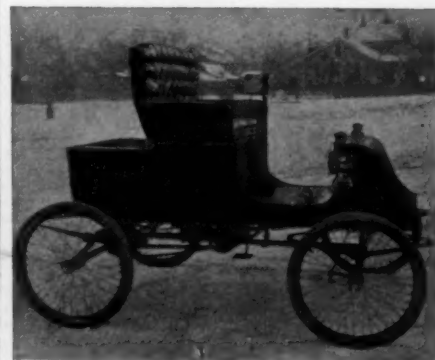
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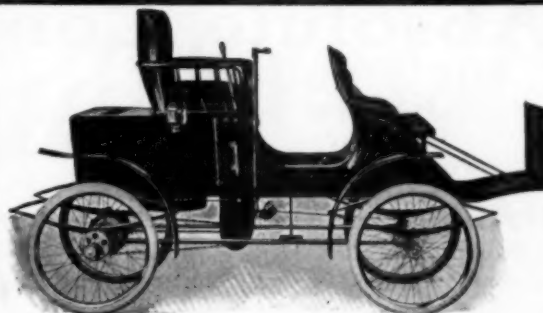
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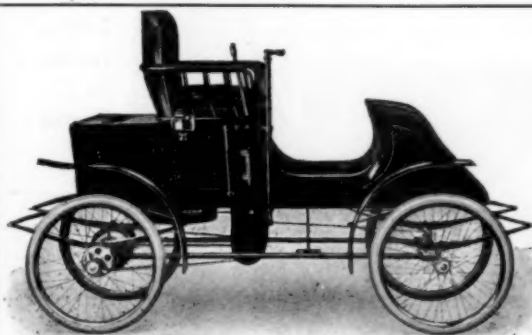
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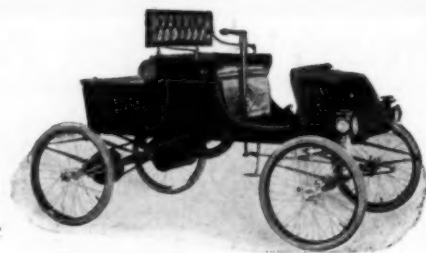
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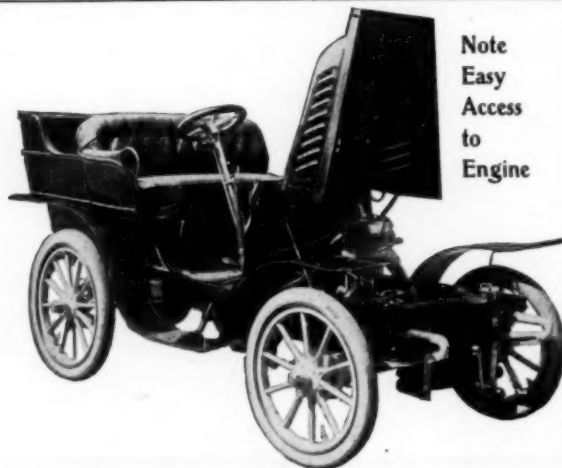
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Model 15. Price \$900. Model 7. Price \$800

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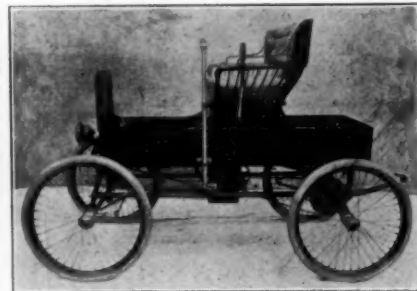
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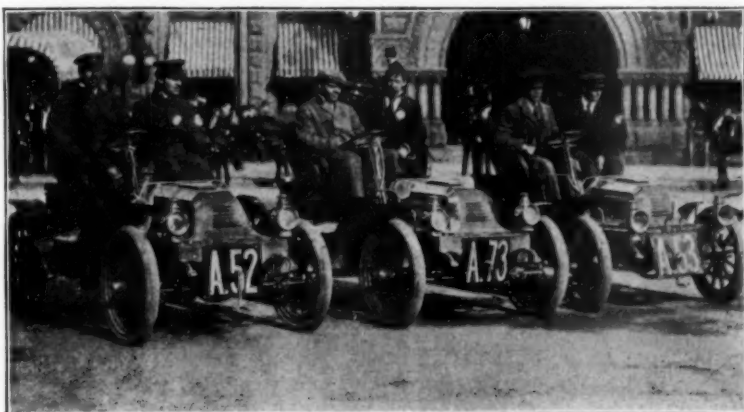
CHAPTER IX.

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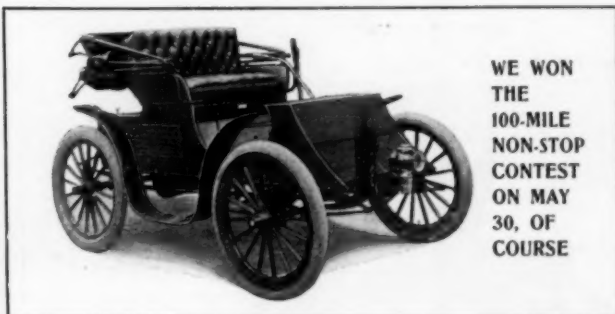
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